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Drinking Water Surveillance Program

WALPOLE ISLAND WATER TREATMENT PLANT

Annual Report 1987

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**Environment
Ontario**

Jim Bradley, Minister

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Walpole island water treatment
plant : annual report 1987.

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WALPOLE ISLAND
WATER TREATMENT PLANT

DRINKING WATER SURVEILLANCE
PROGRAM

ANNUAL REPORT 1987

ONTARIO MINISTRY OF ENVIRONMENT
OCTOBER 1988

c Queen's Printer for Ontario, 1988

ACKNOWLEDGEMENTS

The Drinking Water Surveillance Program (DWSP) employs a team approach requiring the co-operative effort of the Ministry of the Environment (MOE) staff from Water Resources and Laboratory Services Branch and the Regions, as well as plant operational staff from the Municipalities.

This annual report was produced by the DWSP Group (Ron Hunsinger, Peter Bohm, Carol Sackville-Duyvelshoff, Chris Fung and John McGrachan) and by Pat Lachmaniuk (on developmental assignment to the Drinking Water Section). Helpful input and reviews were received from Drinking Water Section Staff, in addition to reviews by other MOE and municipal personnel.

EXECUTIVE SUMMARY

DRINKING WATER SURVEILLANCE PROGRAM WALPOLE ISLAND WATER TREATMENT PLANT 1987 ANNUAL REPORT

The Drinking Water Surveillance Program (DWSP) for Ontario is a monitoring program providing immediate, reliable, current information on drinking water quality. The DWSP officially began in April 1986 and is designed to eventually include all municipal supplies in Ontario. Currently, 44 plants are being monitored.

The Walpole Island Water Treatment Plant is a conventional treatment package plant which treats water from the St. Clair River. The process consists of coagulation, flocculation, sedimentation, filtration and disinfection. This plant serves a population of 1,900 people (21,000 in the summer months) and has a design capacity of 2.51 x 1000m³/day.

Raw and Treated water samples were taken monthly and were analyzed for approximately 160 parameters nine times in 1987. Parameters were divided into the following groups Bacteriological, Inorganic and Physical (Laboratory Chemistry, Field Chemistry and Metals) and Organics (Chloroaromatics, Chlorophenols, Pesticides and PCB, Phenolics, Polynuclear Aromatic Hydrocarbons, Specific Pesticides and Volatiles). Specific Pesticides and Chlorophenols were analysed for in June and November.

A summary of results is shown in Table 1.

Due to its sampling frequency, the DWSP is not designed to evaluate all aspects of the bacteriological quality of water, however routine bacteriological monitoring as outlined in the Ontario Drinking Water Objectives (ODWOs) is carried out by the operating authority. In terms of the limited DWSP bacteriological examination the water was of good quality.

Inorganic and Physical parameters (Laboratory Chemistry, Field Chemistry and Metals) were all below applicable health related ODWOs.

Of approximately 110 Organic parameters tested for on a monthly basis, none exceeded health related guidelines.

Many of the substances detected are naturally occurring or treatment by-products.

During 1987 the DWSP sampling results indicated that the Walpole Island Water Treatment Plant produced good quality water at the plant.

SOMMAIRE

PROGRAMME DE SURVEILLANCE DE L'EAU POTABLE

STATION D'ÉPURATION DE L'EAU DE WALPOLE ISLAND RAPPORT ANNUEL 1987

Le Programme de surveillance de l'eau potable (PSEP) de l'Ontario fournit des informations immédiates, fiables et à jour sur la qualité de l'eau potable. Le PSEP a débuté officiellement en avril 1986. Il est destiné à englober tous les réseaux municipaux d'alimentation en eau de l'Ontario. Actuellement, 44 stations en font partie.

La station d'épuration de Walpole Island est une station classique qui traite l'eau de la rivière Sainte-Claire. Le traitement comporte la coagulation, la floculation, la décantation, la filtration et la désinfection. La station dessert une population de 1 900 habitants (21 000 pendant les mois d'été) et a une capacité nominale de 2,51 x 1 000 m³/jour.

Des prélèvements d'eau brute et d'eau traitée ont été effectués chaque mois. Neuf fois en 1987, ces prélèvements ont été analysés par rapport à environ 160 paramètres dans les catégories suivantes : bactériologique, inorganique et physique (analyses en laboratoire et sur place, présence de métaux) et organique (composés aromatiques chlorés, chlorophénols, pesticides et BPC, dérivés phénoliques, hydrocarbures aromatiques polynucléaires, pesticides particuliers et composés volatils). Les pesticides particuliers et les chlorophénols n'ont été mesurés qu'en juin et en novembre.

Le tableau 1 résume les résultats obtenus.

En raison de la fréquence des prélèvements, le PSEP ne permet pas d'évaluer tous les aspects de la qualité bactériologique de l'eau. Cependant, comme on le recommande dans le cadre des objectifs relatifs à la qualité de l'eau potable en Ontario, un contrôle bactériologique systématique est effectué par l'exploitant. L'analyse bactériologique limitée du PSEP a révélé une eau de bonne qualité.

Les mesures des paramètres inorganiques et physiques (analyses en laboratoire et sur place, présence de métaux) étaient inférieures aux limites applicables fixées par l'Ontario pour l'eau potable.

Pour environ 110 paramètres organiques mesurés chaque mois, aucun résultat n'a dépassé les limites acceptables fixées pour la santé.

Un grand nombre de substances détectées apparaissent naturellement ou sont des produits dérivés de l'épuration.

Les résultats des analyses effectuées en 1987 dans le cadre du PSEP ont indiqué que la station d'épuration de Walpole Island donnait une eau de bonne qualité.

TABLE 1

DRINKING WATER SURVEILLANCE PROGRAM

WALPOLE ISLAND WATER TREATMENT PLANT

SUMMARY TABLE BY SCAN (1987)

SCAN	RAW			TREATED		
	TESTS	POSITIVE	%POSITIVE	TESTS	POSITIVE	%POSITIVE
BACTERIOLOGICAL	31	31	100	27	6	22
CHEMISTRY (FLD)	27	27	100	53	53	100
CHEMISTRY (LAB)	170	133	78	170	109	64
METALS	181	90	49	166	81	48
CHLOROAROMATICS	117	0	0	104	0	0
CHLOROPHENOLS	12	0	0	6	0	0
PAH	68	0	0	68	0	0
PESTICIDES & PCB	222	0	0	200	0	0
PHENOLICS	8	0	0	8	0	0
SPECIFIC PESTICIDES	133	0	0	127	0	0
VOLATILES	253	0	0	252	39	15
TOTAL	1222	281		1181	288	

NO HEALTH RELATED GUIDELINES/LIMITS WERE EXCEEDED

A POSITIVE VALUE DENOTES THAT THE RESULT IS GREATER THAN THE STATISTICAL LIMIT OF DETECTION AND IS QUANTIFIABLE

A '.' INDICATES THAT NO SAMPLE WAS TAKEN

DRINKING WATER SURVEILLANCE PROGRAM
WALPOLE ISLAND WATER TREATMENT PLANT
1987 ANNUAL REPORT

INTRODUCTION

The Drinking Water Surveillance Program (DWSP) for Ontario is a monitoring program providing immediate, reliable, current information on drinking water quality. The DWSP officially began in April 1986 and is designed to eventually include all municipal supplies in Ontario. Currently, 44 plants are being monitored. Appendix A contains a detailed description of the DWSP.

This plant is located on an Indian Reserve and therefore comes under federal jurisdiction, it is included on the DWSP because it is situated on the St. Clair river. The DWSP was initiated at the Walpole Island Water Treatment Plant in April 1986. An annual report was published for 1986 (ISBN 0-7729-2568-2).

This report contains information and results for 1987.

PLANT DESCRIPTION

The Walpole Island Water Treatment Plant is a "package" conventional treatment plant which treats water from the St. Clair river. The process consists of coagulation, flocculation, sedimentation, filtration and disinfection.

Powdered Activated Carbon (PAC) is used to control taste and odour problems. Polyelectrolyte is used as a coagulation aid.

The plant serves a population of 1900 people, which rises to 21,000 during the summer months. The treatment plant has a design capacity of $2.5 \times 1000\text{m}^3/\text{day}$ and daily flows ranging from $0.3 \times 1000\text{m}^3/\text{day}$ to $0.5 \times 1000\text{m}^3/\text{day}$.

The plant location is shown in Figure 1. Plant process details are shown in Figure 2. General plant information is presented in Table 2.

METHODS

Water samples were obtained from two DWSP approved locations;

- i) Raw - The water originated from the lowlift discharge and was sampled through a copper sample line. The sample tap is located at the start of the package plant.
- ii) Treated - The water originated from the highlift discharge after addition of all treatment chemicals and was sampled through a copper sample line. The sample tap is located in the plant laboratory.

FIGURE 1

DRINKING WATER SURVEILLANCE PROGRAM ANNUAL REPORT

SITE LOCATION MAP

LOCATION: WALPOLE ISLAND WATER TREATMENT PLANT

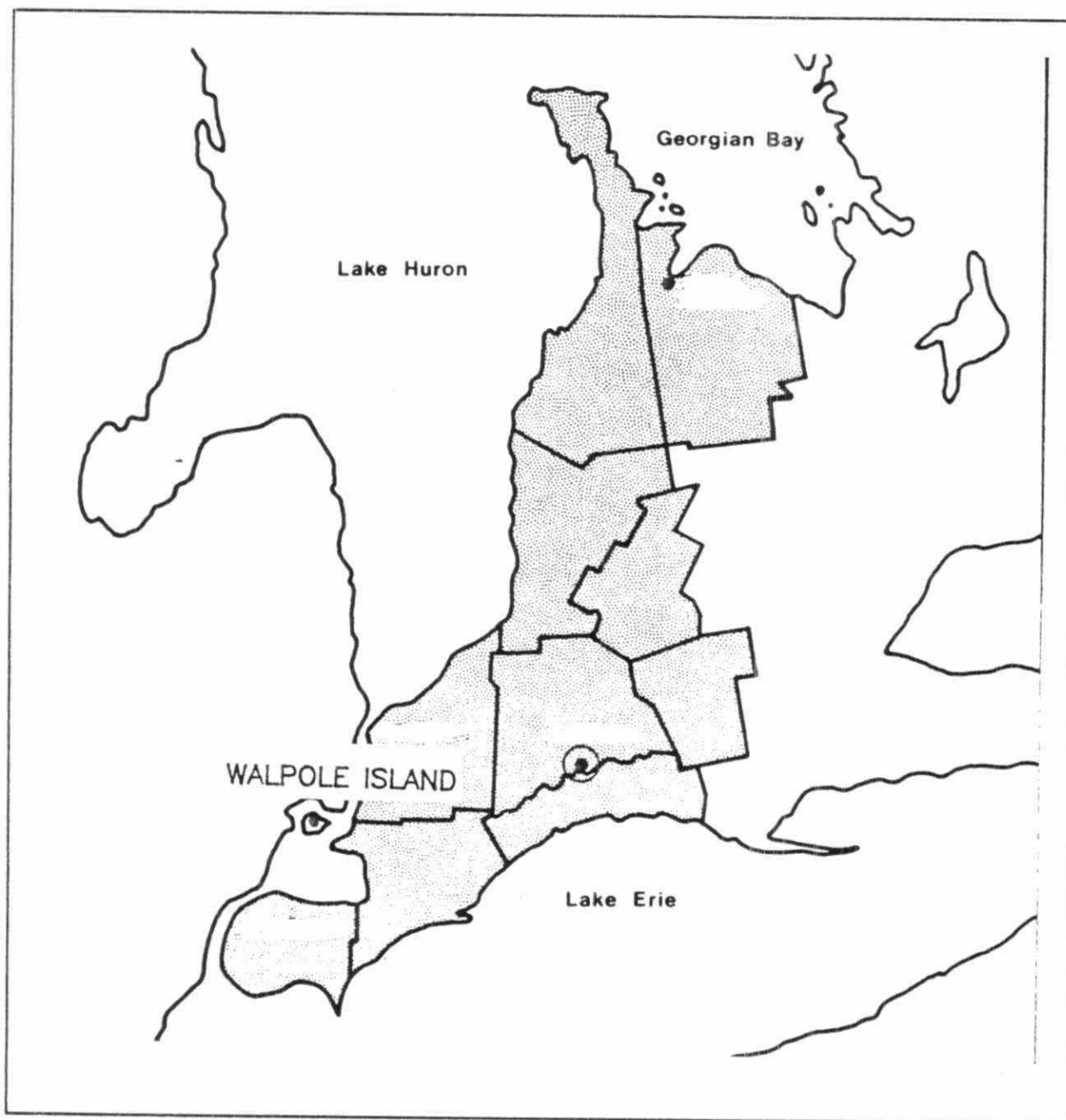


FIGURE 2
WALPOLE ISLAND WATER TREATMENT PLANT

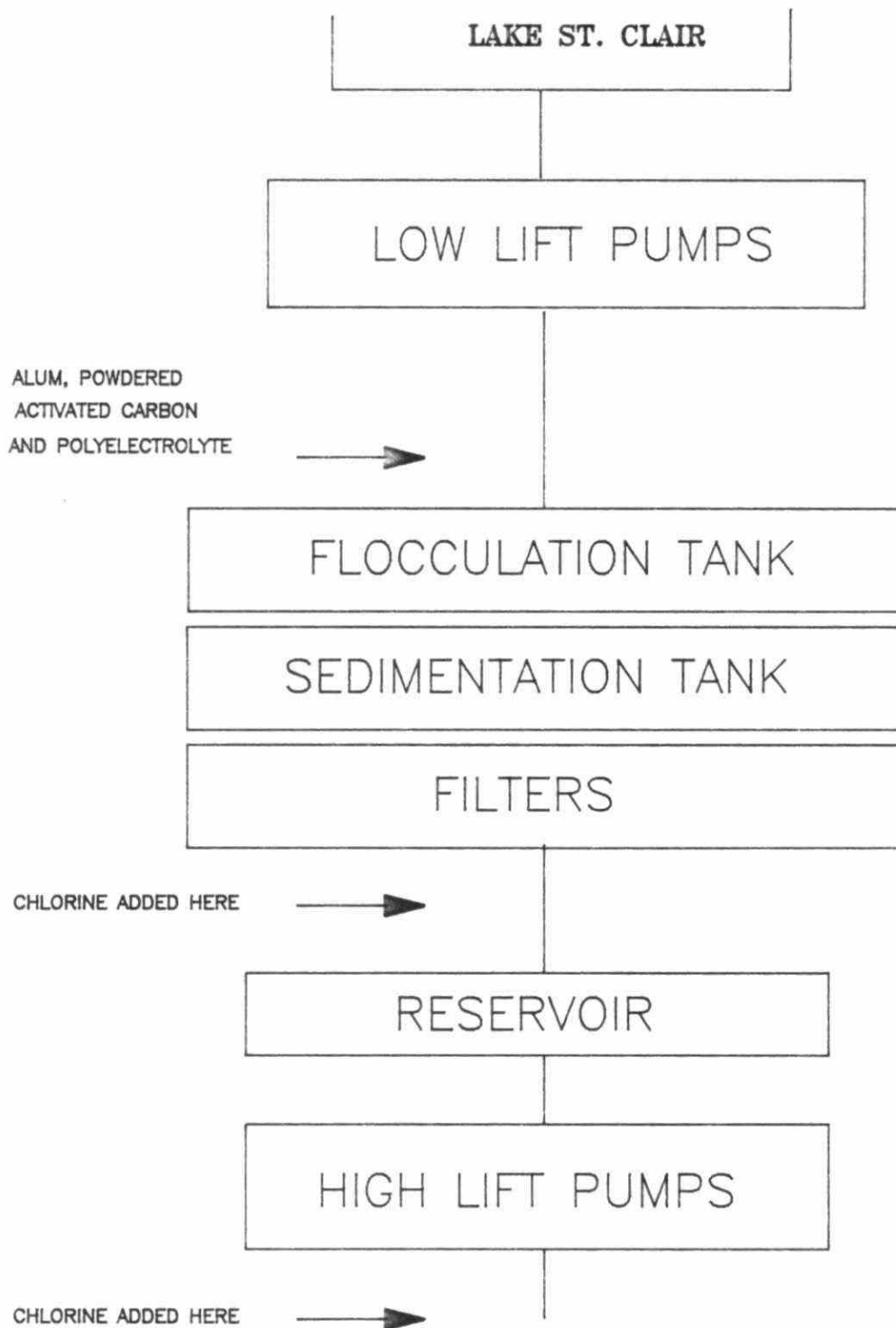


TABLE 2

DRINKING WATER SURVEILLANCE PROGRAM ANNUAL REPORTGENERAL INFORMATIONWALPOLE ISLAND WATER TREATMENT PLANT

<u>LOCATION:</u>	WALPOLE ISLAND, ONTARIO N8A 4K9 (519-627-1426)
<u>SOURCE:</u>	RAW WATER SOURCE - ST. CLAIR RIVER
<u>DESIGN CAPACITY:</u>	2.5 (1000 M3/DAY)
<u>OPERATION:</u>	FEDERAL GOVERNMENT
<u>PLANT SUPERINTENDENT:</u>	J. TOOSHKENIG
<u>MINISTRY REGION:</u>	SOUTHWESTERN
<u>DISTRICT OFFICER:</u>	M. LOOBY
<u>MUNICIPALITY SERVED</u>	<u>POPULATION</u>
WALPOLE ISLAND (SUMMER MONTHS)	1,900 21,000

Sample lines in the plant were flushed prior to sampling to ensure that the water obtained was indicative of its origin and not residual water standing in the sample line.

Attempts were made to capture the same block of water at each sampling point by taking the retention time into consideration. The retention time was calculated by dividing the volume of water between the two sampling points by the sample day flow. For example, if it was determined that the retention time within the plant was five hours then there would be a five hour interval between the raw and treated sampling.

Stringent DWSP sampling protocols were followed to eliminate any variance (Appendix B).

Sample day flow, treatment chemical dosages and field measurements such as Turbidity, Chlorine Residuals, pH and Temperature were recorded on the day of sampling and were entered onto the DWSP data base as submitted.

RESULTS

Water at the Walpole Island Water Treatment Plant was sampled on a monthly basis for approximately 160 parameters nine times in 1987. Specific Pesticides and Chlorophenols were analysed for in June and November.

Table 3 contains information on the sample day retention time, flow rate and treatment chemicals used and their associated dosages.

Table 4 is a summary break-down of the number of water samples analysed for by parameter and by water type. The number of times that a positive or trace result was detected is also reported.

Positive denotes that the result is greater than the statistical limit of detection established by the Ministry of Environment (MOE) laboratory staff and is quantifiable. Trace (<T) denotes that the level measured is greater than the lowest value detectable by the method but lies so close to the detection limit that it cannot be confidently quantified.

Table 5 presents the results for parameters detected on at least one occasion.

Table 6 presents parameters not detected.

Associated guidelines and detection limits are also supplied on both tables. Parameters are listed alphabetically within each scan.

DISCUSSION

General

Water quality is judged by comparison with the Ontario Drinking Water Objectives (ODWOs) as defined in the 1984 publication (ISBN 0-7743-8985-0). The Province of Ontario has health related and aesthetic objectives for 49 parameters, these are currently under review. When an ODWO is not available guidelines/limits from other agencies are consulted. The Parameters Listing System (PALIS) recently initiated by the MOE catalogues and keeps current over 1750 guidelines for 650 parameters from agencies throughout the world.

As stated under Results, traces do not indicate quantifiable results as defined by established MOE laboratory analytical reporting protocols. While they can be useful in trend analysis or confirmation of the presence of a specific contaminant that is repeatedly detected at these levels, the occasional finding of a trace level of a contaminant is not considered to be significant. DISCUSSION OF GUIDELINES AND LIMITS THEREFORE, IS ONLY CARRIED OUT ON POSITIVE RESULTS.

Bacteriology

Positive results for the Bacteriology scan in the treated water, were for Standard Plate Count and Total Coliform Background.

Due to its sampling frequency, the DWSP is not designed to evaluate all aspects of the bacteriological quality of water. Routine bacteriological monitoring as recommended in the ODWOs is carried out by the operating authority. Water from the Walpole Island Water Treatment Plant, in terms of the limited DWSP bacteriological examination, was of good quality.

Inorganic and Physical Parameters

Laboratory and Field Chemistry

The results for the Laboratory Chemistry and Field Chemistry scans were below all applicable health related ODWOs.

It is desirable that the Temperature of drinking water be less than 15°C; the palatability of water is enhanced by its coolness. A temperature below 15°C will tend to reduce the growth of nuisance organisms and hence minimize associated taste, colour, odour and corrosion problems. The desired ODWO was exceeded three times in the treated water.

Metals

The results reported for the Metals scan were all below any applicable health related ODWOs.

At present, there is no evidence that Aluminum is physiologically harmful and no health limit has been specified. The ODWO indicates that a useful guideline is to maintain a residual below

0.1 mg/L as Al in the water leaving the plant to avoid any significant post precipitation problems. The measure of residual Aluminum in the treated water is important to indicate efficiency of the treatment process. Aluminum values exceeded the ODWO operational guideline in two treated water samples.

Organic Parameters

Chloroaromatics

The results of the Chloroaromatics scan showed that one Chloroaromatic was detected:

Hexachloroethane

Hexachloroethane was detected at trace levels, once in both the raw and treated water.

Review of these results, along with information from other water supplies on DWSP, would indicate that certain Chloroaromatics appear more frequently in the treated water than in the raw and almost always only at trace levels. These occurrences could possibly be due to a reaction of chlorine with organics present in the water or in the distribution system.

Chlorophenols

The results of the Chlorophenols scan showed that no Chlorophenols were detected.

Pesticides and PCB (Polychlorinated Biphenyls)

The results of the Pesticides and PCB scan showed that one parameter was detected:

Alpha BHC

Lindane consists of several isomers of BHC (Benzene Hexachloride). Alpha BHC is the most predominant isomer found in the water of the Great Lakes Basin, as indicated in results from other water supplies on DWSP.

Alpha BHC was detected at trace levels eight times in the raw water and the treated water.

Specific Pesticides

Results of the Specific Pesticides scan showed that no parameters were detected.

Phenolics

Phenolics were detected at trace levels, five times in the raw water twice in the treated water. Phenolic compounds are present in the aquatic environment as a result of natural and/or industrial processes.

Polynuclear Aromatic Hydrocarbons (PAH)

The results of the PAH scan showed that no PAHs were detected.

Volatiles

The results of the Volatiles scan showed that six parameters other than Trihalomethanes (THMs), were detected:

Benzene

Toluene

Ethylbenzene

Ortho-Xylene

1,1,1-Trichloroethane

Tetrachloroethylene

Benzene was detected at trace levels, three times in the raw water and five times in the treated water. The positive value for the December treated water was considered to be unreliable due to contamination as per the remark 'UCS'.

Toluene was detected at trace levels, twice in the treated water. The positive value for the December treated water was considered to be unreliable due to contamination as per the remark 'UCS'.

Ethylbenzene was detected at trace levels, three times in the treated water.

Ortho-Xylene (O-Xylene) was detected at a trace level, once in the treated water.

These volatiles are typically found on an occasional basis at other water supplies included on the DWSP usually at trace levels.

1,1,1-Trichloroethane was detected at a trace level, once in the raw water.

Tetrachloroethylene was detected at a trace level, once in the raw water and once in the treated water.

THMs are acknowledged to be produced during the water treatment process and will always occur in chlorinated surface waters. THMs are comprised mainly of Chloroform, Chlorodibromomethane and Dichlorobromomethane. Bromoform occurs occasionally. Results are reported for the individual compounds as well as for total THMs.

Chloroform, Chlorodibromomethane, Dichlorobromomethane and Total THMs were detected in all of the treated water samples. Bromoform was detected at trace levels, six times and as a positive once. All THM occurrences were well below the ODWO of 350 ug/l for Total THMs.

Comparison with the results from the DWSP for 1986 show that the raw and treated water quality from 1986 and 1987 has remained consistent.

CONCLUSIONS

The Walpole Island Water Treatment plant for the sample year of

1987 produced good quality water at the plant.

No health related guidelines, for organic or inorganic parameters, were exceeded during 1987.

RECOMMENDATIONS

Two recommendations can be made:

1) The data base should be reviewed in consultation with Regional, Plant and DWSP personnel to determine if sampling location, sampling frequency and the number of parameters analysed could be revised to allow for a more efficient characterization of the water.

2) Consideration should be given to the inclusion of distribution system sampling sites.

TABLE 3

DRINKING WATER SURVEILLANCE PROGRAM WALPOLE ISLAND WATER TREATMENT PLANT SAMPLE DAY CON 1987

SAMPLE DAY CONDITIONSTREATMENT CHEMICAL DOSAGES (MG/L)

DATE	RETENTION TIME(HRS)	FLOW (1000 M3)	PRE-CHLORINATION	COAGULATION AID	COAGULATION	CARBON	POST-CHLORINATION
			CHLORINE	POLYELECTROLYTE	ALUM DRY	ACTIVATED CARBON POWDER	CHLORINE
MAR 18	60.0	.3	1.00	.45	30.00	12.00	1.00
JUN 08	48.0	.0	1.50	1.50	6.00	6.00	1.00
JUL 06	35.0	.0	1.50	.	6.00	6.00	1.00
AUG 04	38.6	.5	1.50	.	6.00	6.00	1.00
SEP 08	35.1	.5	1.50	1.50	4.00	6.00	1.00
OCT 05	24.0	.4	1.50	1.75	7.00	5.00	1.00
OCT 28	51.4	.3	1.50	.12	6.00	5.00	1.00
NOV 03	52.1	.3	1.50	1.75	5.00	7.50	1.00
DEC 08	42.7	.3	1.50	.17	5.00	7.50	1.00

TABLE 4

DRINKING WATER SURVEILLANCE PROGRAM WALPOLE ISLAND WATER TREATMENT PLANT

SUMMARY TABLE OF RESULTS (1987)

SCAN	PARAMETER	RAW			TREATED		
		TOTAL	POSITIVE	TRACE	TOTAL	POSITIVE	TRACE
BACTERIOLOGICAL	FECAL COLIFORM MF	8	8	0	.	.	.
	P/A BOTTLE	.	.	.	7	0	0
	STANDRD PLATE CNT MF	5	5	0	6	5	0
	T COLIFORM BCKGRD MF	9	9	0	7	1	0
	TOTAL COLIFORM MF	9	9	0	7	0	0
*TOTAL SCAN BACTERIOLOGICAL		31	31	0	27	6	0
*TOTAL GROUP BACTERIOLOGICAL		31	31	0	27	6	0
CHEMISTRY (FLD)	FLD CHLORINE (COMB)	.	.	.	8	8	0
	FLD CHLORINE FREE	.	.	.	9	9	0
	FLD PH	9	9	0	9	9	0
	FLD TURBIDITY	9	9	0	9	9	0
	TEMPERATURE	9	9	0	9	9	0
	TOTAL CHLORINE	.	.	.	9	9	0
*TOTAL SCAN CHEMISTRY (FLD)		27	27	0	53	53	0
CHEMISTRY (LAB)	ALKALINITY	9	9	0	9	9	0
	AMMONIUM TOTAL	9	8	1	9	0	3
	CALCIUM	9	9	0	9	9	0
	CHLORIDE	9	9	0	9	9	0
	COLOUR	9	0	9	9	0	4

TABLE 4

DRINKING WATER SURVEILLANCE PROGRAM WALPOLE ISLAND WATER TREATMENT PLANT

SUMMARY TABLE OF RESULTS (1987)

SCAN	PARAMETER	RAW			TREATED		
		TOTAL	POSITIVE	TRACE	TOTAL	POSITIVE	TRACE
CHEMISTRY (LAB)	CONDUCTIVITY	9	9	0	9	9	0
	CYANIDE	8	0	0	8	0	0
	FLUORIDE	9	9	0	9	7	2
	HARDNESS	9	9	0	9	9	0
	MAGNESIUM	9	9	0	9	9	0
	NITRITE	9	6	3	9	0	2
	NITROGEN TOT KJELD	9	8	1	9	3	5
	PH	9	9	0	9	9	0
	PHOSPHORUS FIL REACT	9	1	6	9	0	3
	PHOSPHORUS TTL-UNFIL	9	2	6	9	1	5
	RESIDUE (TOTAL)	9	9	0	9	9	0
	SODIUM	9	9	0	9	9	0
	TOTAL NITRATES	9	9	0	9	9	0
	TURBIDITY	9	9	0	9	8	1
*TOTAL SCAN CHEMISTRY (LAB)		170	133	26	170	109	25
METALS	ALUMINUM	9	9	0	8	8	0
	ARSENIC	9	0	0	9	0	0
	BARIUM	9	9	0	8	8	0
	BERYLLIUM	9	0	0	8	0	0
	BORON	9	0	6	9	1	6
	CADMIUM	9	0	0	8	0	0
	CHROMIUM	9	7	0	8	5	0

TABLE 4

DRINKING WATER SURVEILLANCE PROGRAM WALPOLE ISLAND WATER TREATMENT PLANT

SUMMARY TABLE OF RESULTS (1987)

SCAN	PARAMETER	RAW			TREATED		
		TOTAL	POSITIVE	TRACE	TOTAL	POSITIVE	TRACE
METALS	COBALT	9	0	0	8	0	0
	COPPER	9	7	0	8	8	0
	CYANIDE	1	0	0	1	0	0
	IRON	9	9	0	8	8	0
	LEAD	9	1	0	8	2	0
	MANGANESE	9	9	0	8	8	0
	MERCURY	9	6	0	9	6	0
	MOLYBDENUM	9	1	0	8	2	0
	NICKEL	9	6	0	8	4	0
	SELENIUM	9	0	0	9	0	0
	STRONTIUM	9	9	0	8	8	0
	URANIUM	9	8	0	9	6	0
	VANADIUM	9	1	0	8	0	0
	ZINC	9	8	0	8	7	0
*TOTAL SCAN METALS		181	90	6	166	81	6
*TOTAL GROUP INORGANIC & PHYSICAL		378	250	32	389	243	31
BASE NEUTRAL EXTRAC		20	0	0	20	0	0
	NAPHTHALENE	1	0	0	1	0	0
*TOTAL SCAN BASE NEUTRAL EXTRAC		21	0	0	21	0	0
CHLOROAROMATICS	123 TRICHLOROBENZENE	9	0	0	8	0	0

TABLE 4

DRINKING WATER SURVEILLANCE PROGRAM WALPOLE ISLAND WATER TREATMENT PLANT

SUMMARY TABLE OF RESULTS (1987)

SCAN	PARAMETER	RAW			TREATED		
		TOTAL POSITIVE TRACE			TOTAL POSITIVE TRACE		
CHLOROAROMATICS	1234 T-CHLOROBENZENE	9	0	0	8	0	0
	1235 T-CHLOROBENZENE	9	0	0	8	0	0
	124 TRICHLOROBENZENE	9	0	0	8	0	0
	1245 T-CHLOROBENZENE	9	0	0	8	0	0
	135 TRICHLOROBENZENE	9	0	0	8	0	0
	236 TRICHLOROTOLUENE	9	0	0	8	0	0
	245 TRICHLOROTOLUENE	9	0	0	8	0	0
	26A TRICHLOROTOLUENE	9	0	0	8	0	0
	HEXACHLOROBUTADIENE	9	0	0	8	0	0
	HEXACHLOROETHANE	9	0	1	8	0	1
	OCTACHLOROSTYRENE	9	0	0	8	0	0
	PENTACHLOROBENZENE	9	0	0	8	0	0
	*TOTAL SCAN CHLOROAROMATICS	117	0	1	104	0	1
CHLOROPHENOLS	234 TRICHLOROPHENOL	2	0	0	1	0	0
	2345 T-CHLOROPHENOL	2	0	0	1	0	0
	2356 T-CHLOROPHENOL	2	0	0	1	0	0
	245-TRICHLOROPHENOL	2	0	0	1	0	0
	246-TRICHLOROPHENOL	2	0	0	1	0	0
	PENTACHLOROPHENOL	2	0	0	1	0	0
*TOTAL SCAN CHLOROPHENOLS		12	0	0	6	0	0

TABLE 4

DRINKING WATER SURVEILLANCE PROGRAM WALPOLE ISLAND WATER TREATMENT PLANT

SUMMARY TABLE OF RESULTS (1987)

SCAN	PARAMETER	RAW			TREATED		
		TOTAL POSITIVE TRACE			TOTAL POSITIVE TRACE		
PAH	ANTHANTHRENE	0	0	0	0	0	0
	ANTHRACENE	4	0	0	4	0	0
	BENZO(A)ANTHRACENE	4	0	0	4	0	0
	BENZO (A) PYRENE	4	0	0	4	0	0
	BENZO(B) CHRYSENE	4	0	0	4	0	0
	BENZO(B) FLUORANTHEN	4	0	0	4	0	0
	BENZO(E)PYRENE	4	0	0	4	0	0
	BENZO(G,H,I) PERYLEN	4	0	0	4	0	0
	BENZO(J) FLUORANTHEN	0	0	0	0	0	0
	BENZO(K) FLUORANTHEN	4	0	0	4	0	0
	CHRYSENE	4	0	0	4	0	0
	CORONENE	4	0	0	4	0	0
	DIBENZO(A,H) ANTHRAC	4	0	0	4	0	0
	DIMETH. BENZ(A)ANTHR	4	0	0	4	0	0
	FLUORANTHENE	4	0	0	4	0	0
	INDENO(1,2,3-C,D) PY	4	0	0	4	0	0
	PERYLENE	4	0	0	4	0	0
	PHENANTHRENE	4	0	0	4	0	0
	PYRENE	4	0	0	4	0	0
	*TOTAL SCAN PAH	68	0	0	68	0	0
PESTICIDES & PCB	ALACHLOR	8	0	0	8	0	0
	ALDRIN	9	0	0	8	0	0

TABLE 4

DRINKING WATER SURVEILLANCE PROGRAM WALPOLE ISLAND WATER TREATMENT PLANT

SUMMARY TABLE OF RESULTS (1987)

SCAN	PARAMETER	RAW			TREATED		
		TOTAL POSITIVE TRACE			TOTAL POSITIVE TRACE		
PESTICIDES & PCB	ALPHA BHC	9	0	8	8	0	8
	ALPHA CHLORDANE	9	0	0	8	0	0
	ATRATONE	8	0	0	8	0	0
	BETA BHC	9	0	0	8	0	0
	DIELDRIN	9	0	0	8	0	0
	ENDRIN	9	0	0	8	0	0
	ETHYLENE DIBROMIDE	8	0	0	8	0	0
	GAMMA CHLORDANE	9	0	0	8	0	0
	HCB	9	0	0	8	0	0
	HEPTACHLOR	9	0	0	8	0	0
	HEPTACHLOR EPOXIDE	9	0	0	8	0	0
	LINDANE	9	0	0	8	0	0
	METHOXYCHLOR	9	0	0	8	0	0
	MIREX	9	0	0	8	0	0
	OPDDT	9	0	0	8	0	0
	OXYCHLORDANE	9	0	0	8	0	0
	PCB	9	0	0	8	0	0
	PP-DDD	9	0	0	8	0	0
	PPDDE	9	0	0	8	0	0
	PPDDT	9	0	0	8	0	0
	THIODAN I	9	0	0	8	0	0
	THIODAN II	9	0	0	8	0	0
	THIODAN SULPHATE	9	0	0	8	0	0
*TOTAL SCAN PESTICIDES & PCB		222	0	8	200	0	8

TABLE 4

DRINKING WATER SURVEILLANCE PROGRAM WALPOLE ISLAND WATER TREATMENT PLANT

SUMMARY TABLE OF RESULTS (1987)

SCAN	PARAMETER	RAW			TREATED		
		TOTAL	POSITIVE	TRACE	TOTAL	POSITIVE	TRACE
PHENOLICS	PHENOL	8	0	5	8	0	2
*TOTAL SCAN PHENOLICS		8	0	5	8	0	2

SPECIFIC PESTICIDES	2,4,5-T	2	0	0	1	0	0
	2,4-D	2	0	0	1	0	0
	2,4-DP	2	0	0	1	0	0
	2,4-DCHLRPHENOXYBUTYRC	2	0	0	1	0	0
	AMETRYNE	9	0	0	9	0	0
	AMINOCARB	0	0	0	0	0	0
	ATRAZINE	9	0	0	9	0	0
	BENOMYL	0	0	0	0	0	0
	BLADEX	9	0	0	9	0	0
	BUX	1	0	0	1	0	0
	CARBOFURAN	2	0	0	2	0	0
	CIPC	2	0	0	2	0	0
	DIALATE	2	0	0	2	0	0
	DIAZINON	2	0	0	2	0	0
	DICAMBA	2	0	0	1	0	0
	DICHLOROVOS	2	0	0	2	0	0
	DURSBAN	2	0	0	2	0	0
	EPTAM	2	0	0	2	0	0
	ETHION	2	0	0	2	0	0
	GUTHION	0	0	0	0	0	0

TABLE 4

DRINKING WATER SURVEILLANCE PROGRAM WALPOLE ISLAND WATER TREATMENT PLANT

SUMMARY TABLE OF RESULTS (1987)

SCAN	PARAMETER	RAW			TREATED		
		TOTAL POSITIVE TRACE			TOTAL POSITIVE TRACE		
SPECIFIC PESTICIDES	IPC	2	0	0	2	0	0
	MALATHION	2	0	0	2	0	0
	METHYL PARATHION	2	0	0	2	0	0
	METHYLTRITHION	2	0	0	2	0	0
	METOLACHLOR	8	0	0	8	0	0
	MEVINPHOS	2	0	0	2	0	0
	PARATHION	2	0	0	2	0	0
	PHORATE	2	0	0	2	0	0
	PICHLORAM	0	0	0	0	0	0
	PROMETONE	9	0	0	9	0	0
	PROMETRYNE	9	0	0	9	0	0
	PROPAZINE	9	0	0	9	0	0
	PROPOXUR	2	0	0	2	0	0
	RELDAN	2	0	0	2	0	0
	RONNEL	2	0	0	2	0	0
	SENCOR	9	0	0	9	0	0
	SEVIN	2	0	0	2	0	0
	SILVEX	2	0	0	1	0	0
	SIMAZINE	9	0	0	9	0	0
	SUTAN	2	0	0	2	0	0
	TOXAPHENE	0	0	0	0	0	0
*TOTAL SCAN SPECIFIC PESTICIDES		133	0	0	127	0	0
VOLATILES	1,1 DICHLOROETHANE	9	0	0	9	0	0

TABLE 4

DRINKING WATER SURVEILLANCE PROGRAM WALPOLE ISLAND WATER TREATMENT PLANT

SUMMARY TABLE OF RESULTS (1987)

SCAN	PARAMETER	RAW			TREATED		
		TOTAL POSITIVE TRACE			TOTAL POSITIVE TRACE		
VOLATILES	1,1 DICHLOROETHYLENE	9	0	0	9	0	0
	1,2 DICHLOROBENZENE	9	0	0	9	0	0
	1,2 DICHLOROETHANE	9	0	0	9	0	0
	1,2 DICHLOROPROPANE	9	0	0	9	0	0
	1,3 DICHLOROBENZENE	9	0	0	9	0	0
	1,4 DICHLOROBENZENE	9	0	0	9	0	0
	111, TRICHLOROETHANE	9	0	1	9	0	0
	112 TRICHLOROETHANE	9	0	0	9	0	0
	1122 T-CHLOROETHANE	9	0	0	9	0	0
	BENZENE	9	0	3	9	1	5
	BROMOFORM	9	0	0	9	1	6
	CARBON TETRACHLORIDE	9	0	0	9	0	0
	CHLOROBENZENE	9	0	0	9	0	0
	CHLORODIBROMOMETHANE	9	0	0	9	9	0
	CHLOROFORM	9	0	0	9	9	0
	DICHLOROBROMOMETHANE	9	0	0	9	9	0
	DICHLOROMETHANE	9	0	0	8	0	0
	ETHYLBENZENE	9	0	0	9	0	3
	ETHYLENE DIBROMIDE	1	0	0	1	0	0
	M-XYLENE	9	0	0	9	0	0
	O-XYLENE	9	0	0	9	0	1
	P-XYLENE	9	0	0	9	0	0
	T-CHLOROETHYLENE	9	0	1	9	0	1
	T1,2DICHLOROETHYLENE	9	0	0	9	0	0
	TOLUENE	9	0	0	9	1	2

TABLE 4

DRINKING WATER SURVEILLANCE PROGRAM WALPOLE ISLAND WATER TREATMENT PLANT

SUMMARY TABLE OF RESULTS (1987)

SCAN	PARAMETER	RAW			TREATED		
		TOTAL	POSITIVE	TRACE	TOTAL	POSITIVE	TRACE
VOLATILES	TOTL TRIHALOMETHANES	9	0	0	9	9	0
	TRICHLOROETHYLENE	9	0	0	9	0	0
	TRIFLUOROCHLOROTOLUE	9	0	0	9	0	0
*TOTAL SCAN VOLATILES		253	0	5	252	39	18
*TOTAL GROUP ORGANIC		834	0	19	786	39	29

TOTAL		1243	281	51	1202	288	60

KEY TO TABLES 5 AND 6

- A ONTARIO DRINKING WATER OBJECTIVES
1. Maximum Acceptable Concentration (MAC)
 - 1+. MAC for Total Trihalomethanes
 - 1*. MAC for Bacteriological Analyses
- Poor water quality is indicated when :
- total coliform counts > 0 < 5
 - P/A Bottle Test is present after 48 hours
 - Aeromonas organisms are detected in more than 25% of samples in a single submission or in successive submissions from the same sampling site
 - Pseudomonas Aeruginosa, Staphylococcus Aureus and members of the Fecal Streptococcus group should not be detected in any sample
 - Standard Plate Count should not exceed 500 organisms per ml at 35 deg C within 48 hours
2. Interim Maximum Acceptable Concentration (IMAC)
 3. Maximum Desirable Concentration (MDC)
 4. Aesthetic or Recommended Operational Guideline
- hardness levels between 80 and 100 mg/L as calcium carbonate are considered to provide an acceptable balance between corrosion and incrustation, water supplies with a hardness >200 mg/L are considered poor and those in excess of 500 mg/L are unacceptable.
- B HEALTH & WELFARE CANADA
1. Maximum Acceptable Concentration (MAC)
 2. Proposed MAC
 3. Interim MAC
- C WORLD HEALTH ORGANIZATION
1. Guideline Value (GV)
 2. Tentative GV
 3. Aesthetic GV
- D US ENVIRONMENTAL PROTECTION AGENCY (EPA)
1. Maximum Contaminant Level (MCL)
 2. Suggested No-Adverse Effect Level (SNAEL)
 3. Lifetime Health Advisory
 4. EPA Ambient Water Quality Criteria
- F EUROPEAN ECONOMIC COMMUNITY (EEC)
1. Health Related Guideline Level
 2. Aesthetic Guideline Level
 3. Maximum Admissible Concentration (MADC)
- G CALIFORNIA STATE DEPARTMENT OF HEALTH-GUIDELINE VALUE
- H USSR MAXIMUM PERMISSIBLE CONCENTRATION
- I NEW YORK STATE AMBIENT WATER GUIDELINE

LABORATORY RESULTS, REMARK DESCRIPTIONS

.	No Sample Taken
BDL	Below Minimum Measurable Amount
<T	Greater Than Detection Limit But Not Confident
>	Results Are Greater Than The Upper Limit
<=>	Approximate Result
!AW	No Data: Analysis Withdrawn
!CR	No Data: Could Not Confirm By Reanalysis
!CS	No Data: Contamination Suspected
!IL	No Data: Sample Incorrectly Labelled
!IS	No Data: Insufficient Sample
!LA	No Data: Laboratory Accident
!LD	No Data: Test Queued After Sample Discarded
!NA	No Data: No Authorization To Perform Reanalysis
!NP	No Data: No Procedure
!NR	No Data: Sample Not Received
!OP	No Data: Obscured Plate
!PE	No Data: Procedural Error - Sample Discarded
!PH	No Data: Sample pH Outside Valid Range
!RO	No Data: See Attached Report (no numeric results)
!SM	No Data: Sample Missing
!SS	No Data: Send Separate Sample Properly Preserved
!UI	No Data: Indeterminant Interference
A3C	Approximate, Total Count Exceeded 300 Colonies
APL	Additional Peak, Large, Not Priority Pollutant
APS	Additional Peak, Less Than, Not Priority Pollutant
CIC	Possible Contamination, Improper Cap
CRO	Calculated Result Only
PPS	Test Performed On Preserved Sample

RMP	P and M-Xylene Not Separated
RRV	Rerun Verification
RVU	Reported Value Unusual
SPS	Several Peaks, Small, Not Priority Pollutant
UAL	Unreliable: Sample Age Exceeds Normal Limit
UCR	Unreliable: Could Not Confirm By Reanalysis
UCS	Unreliable: Contamination Suspected
UIN	Unreliable: Indeterminant Interference
XP	Positive After X Number of Hours

KEY TO TABLES 5 AND 6

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XP	Positive After X Number of Hours

TABLE 5

DRINKING WATER SURVEILLANCE PROGRAM WALPOLE ISLAND WATER TREATMENT PLANT 1987

WATER TREATMENT PLANT

DISTRIBUTION SYSTEM

RAW TREATED

BACTERIOLOGICAL

FECAL COLIFORM MF (CT/100ML)

DET'N LIMIT = 0

GUIDELINE = 0 (A1)

MAR	72	.
JUN	6	.
JUL	19	.
AUG	17	.
SEP	118	.
OCT	41	.
	!LA	.
NOV	150 >	.
DEC	157	.

STANDRD PLATE CNT MF (CT/ML)

DET'N LIMIT = 0

GUIDELINE = 500/ML (A1)

MAR	!AW	!AW
JUN	2400 >	1
JUL	2400 >	27
AUG	2400 >	.
SEP	!AW	24
OCT	!AW	!AW
	!OP	0
NOV	900	7
DEC	600	3

P/A BOTTLE (0=ABSENT)

DET'N LIMIT = 0

GUIDELINE = 0 (A1*)

MAR	.	0
-----	---	---

TABLE 5

DRINKING WATER SURVEILLANCE PROGRAM WALPOLE ISLAND WATER TREATMENT PLANT 1987

WATER TREATMENT PLANT		DISTRIBUTION SYSTEM
RAW	TREATED	
<hr/>		
JUN	.	0
JUL	.	0
SEP	.	0
OCT	.	0
	.	!LA
NOV	.	0
DEC	.	0
<hr/>		
TOTAL COLIFORM MF (CT/100ML)		DET'N LIMIT = 0
		GUIDELINE = 5/100ML(A1)
MAR	1000	0
JUN	44 A3C	0
JUL	300 A3C	!LA
AUG	100 A3C	.
SEP	2500 A3C	0
OCT	2300 A3C	0
	150 >	0
NOV	4900	0
DEC	3100	0
<hr/>		
T COLIFORM BCKGRD MF (CT/100ML)		DET'N LIMIT = 0
		GUIDELINE = N/A
MAR	3100	0
JUN	740	0
JUL	40000 >	!LA
AUG	4800 >	.
SEP	04000	0

TABLE 5

DRINKING WATER SURVEILLANCE PROGRAM WALPOLE ISLAND WATER TREATMENT PLANT 1987

WATER TREATMENT PLANT

DISTRIBUTION SYSTEM

RAW

TREATED

OCT	80000	4
	2400 >	0
NOV	12800	0
DEC	6400	0

TABLE 5

DRINKING WATER SURVEILLANCE PROGRAM WALPOLE ISLAND WATER TREATMENT PLANT 1987

WATER TREATMENT PLANT		DISTRIBUTION SYSTEM	
RAW	TREATED		

CHEMISTRY (FLD)			
FLD CHLORINE (COMB) (MG/L)		DET'N LIMIT = N/A	GUIDELINE = N/A
MAR	.100		
JUN	.100		
JUL	.100		
SEP	.200		
OCT	.400		
	.300		
NOV	.500		
DEC	.100		

FLD CHLORINE FREE (MG/L)		DET'N LIMIT = N/A	GUIDELINE = N/A
MAR	.700		
JUN	.700		
JUL	.400		
AUG	.800		
SEP	.900		
OCT	.700		
	1.200		
NOV	.400		
DEC	1.000		

TOTAL CHLORINE (MG/L)		DET'N LIMIT = N/A	GUIDELINE = N/A
MAR	.800		
JUN	.800		

TABLE 5

DRINKING WATER SURVEILLANCE PROGRAM WALPOLE ISLAND WATER TREATMENT PLANT 1987

WATER TREATMENT PLANT		DISTRIBUTION SYSTEM	
	RAW	TREATED	
<hr/>			
JUL	.	.500	
AUG	.	1.000	
SEP	.	1.100	
OCT	.	1.100	
	.	1.500	
NOV	.	.900	
DEC	.	1.100	
<hr/>			
FLD PH (DMSNLESS)	DET'N LIMIT = N/A		GUIDELINE = 6.5-8.5 (A4)
MAR	7.700	6.800	
JUN	7.900	7.600	
JUL	7.700	7.200	
AUG	8.000	7.500	
SEP	8.500	7.500	
OCT	8.500	8.000	
	7.700	7.500	
NOV	8.500	7.200	
DEC	7.800	7.200	
<hr/>			
TEMPERATURE (DEG.C)	DET'N LIMIT = N/A		GUIDELINE = N/A
MAR	.500	2.000	
JUN	15.500	15.000	
JUL	19.500	20.000	
AUG	24.000	23.500	
SEP	19.700	20.000	

TABLE 5

DRINKING WATER SURVEILLANCE PROGRAM WALPOLE ISLAND WATER TREATMENT PLANT 1987

WATER TREATMENT PLANT		DISTRIBUTION SYSTEM
	RAW	TREATED
<hr/>		
OCT	15.500	14.000
	11.000	11.000
NOV	11.000	11.500
DEC	6.500	6.500
<hr/>		
FLD TURBIDITY (FTU))	DET'N LIMIT = N/A
		GUIDELINE = 1.0 (A1)
MAR	32.000	.280
JUN	3.300	.120
JUL	4.100	.070
AUG	3.800	.100
SEP	4.200	.100
OCT	16.200	.190
	4.100	.100
NOV	4.200	.060
DEC	4.300	.040

TABLE 5

DRINKING WATER SURVEILLANCE PROGRAM WALPOLE ISLAND WATER TREATMENT PLANT 1987

WATER TREATMENT PLANT		DISTRIBUTION SYSTEM	
RAW	TREATED		
<hr/>			
CHEMISTRY (LAB)			
ALKALINITY (MG/L)		DET'N LIMIT = .200	GUIDELINE = 30-500 (A4)
MAR	88.700	64.800	
JUN	87.200	80.000	
JUL	85.900	72.000	
AUG	85.600	76.600	
SEP	85.000	75.700	
OCT	85.200	70.000	
	82.700	78.900	
NOV	84.100	77.400	
DEC	83.200	77.600	
<hr/>			
CALCIUM (MG/L)		DET'N LIMIT = .100	GUIDELINE = 100. (F2)
MAR	29.900	31.500	
JUN	28.400	29.200	
JUL	28.000	28.400	
AUG	27.600	28.400	
SEP	28.800	28.800	
OCT	28.800	29.200	
	27.800	28.800	
NOV	28.400	28.600	
DEC	28.000	28.000	
<hr/>			
CHLORIDE (MG/L)		DET'N LIMIT = .200	GUIDELINE = 250.0 (A3)
MAR	12.500	12.000	

TABLE 5

DRINKING WATER SURVEILLANCE PROGRAM WALPOLE ISLAND WATER TREATMENT PLANT 1987

WATER TREATMENT PLANT		DISTRIBUTION SYSTEM	
	RAW	TREATED	
<hr/>			
JUN	9.000	9.500	
JUL	8.500	9.000	
AUG	9.000	10.000	
SEP	9.500	9.500	
OCT	8.500	7.500	
	9.400	10.300	
NOV	9.700	9.800	
DEC	9.500	10.600	
<hr/>			
COLOUR (TCU)	DET'N LIMIT = .5		GUIDELINE = 5.0 (A3)
MAR	2.500 <T	.500 <T	
JUN	1.000 <T	BDL	
JUL	1.500 <T	.500 <T	
AUG	1.500 <T	BDL	
SEP	1.500 <T	.500 <T	
OCT	1.000 <T	BDL	
	1.000 <T	BDL	
NOV	1.000 <T	BDL	
DEC	1.500 <T	.500 <T	
<hr/>			
CONDUCTIVITY (UMHO/CM)	DET'N LIMIT = 1		GUIDELINE = 400. (F2)
MAR	254	266	
JUN	238	246	
JUL	231	241	
AUG	227	236	

TABLE 5

DRINKING WATER SURVEILLANCE PROGRAM WALPOLE ISLAND WATER TREATMENT PLANT 1987

WATER TREATMENT PLANT		DISTRIBUTION SYSTEM	
	RAW	TREATED	
<hr/>			
SEP	225	234	
OCT	225	230	
	221	233	
NOV	229	231	
DEC	225	233	
<hr/>			
FLUORIDE (MG/L)		DET'N LIMIT = .01	GUIDELINE = 2.400 (A1)
MAR	.120	.050 <T	
JUN	.110	.080	
JUL	.080	.060	
AUG	.090	.100	
SEP	.080	.060	
OCT	.060	.040 <T	
	.080	.080	
NOV	.080	.060	
DEC	.080	.060	
<hr/>			
HARDNESS (MG/L)		DET'N LIMIT = .500	GUIDELINE = 80-100 (A4)
MAR	107.000	109.500	
JUN	103.000	105.000	
JUL	100.000	100.000	
AUG	99.000	101.000	
SEP	102.000	103.000	
OCT	102.000	104.000	
	99.000	102.000	

TABLE 5

DRINKING WATER SURVEILLANCE PROGRAM WALPOLE ISLAND WATER TREATMENT PLANT 1987

WATER TREATMENT PLANT			DISTRIBUTION SYSTEM	
	RAW	TREATED		

NOV	102.000	102.000		
DEC	101.000	102.000		

MAGNESIUM (MG/L)			DET'N LIMIT = .050	GUIDELINE = 30. (F2)
MAR	7.800	7.400		
JUN	7.800	7.800		
JUL	7.100	7.000		
AUG	7.400	7.400		
SEP	7.400	7.400		
OCT	7.400	7.500		
	7.200	7.400		
NOV	7.400	7.300		
DEC	7.600	7.800		

SODIUM (MG/L)			DET'N LIMIT = .200	GUIDELINE = 200. (C3)
MAR	8.000	6.900		
JUN	5.800	5.600		
JUL	2.000	6.200		
AUG	5.800	5.800		
SEP	6.400	6.600		
OCT	6.400	5.400		
	5.800	6.000		
NOV	6.200	5.400		
DEC	6.000	6.000		

TABLE 5

DRINKING WATER SURVEILLANCE PROGRAM WALPOLE ISLAND WATER TREATMENT PLANT 1987

WATER TREATMENT PLANT		DISTRIBUTION SYSTEM	
	RAW	TREATED	
<hr/>			
AMMONIUM TOTAL (MG/L)		DET'N LIMIT = 0.002	GUIDELINE = .05 (F2)
MAR	.028	BDL	
JUN	.028	.002 <T	
JUL	.012	BDL	
AUG	.006 <T	.004 <T	
SEP	.020	.002 <T	
OCT	.302	BDL	
	.024	BDL	
NOV	.016	BDL	
DEC	.016	BDL	
<hr/>			
NITRITE (MG/L)		DET'N LIMIT = 0.001	GUIDELINE = 1.000 (A1)
MAR	.006	BDL	
JUN	.006	.001 <T	
JUL	.005	BDL	
AUG	.002 <T	BDL	
SEP	.005	.001 <T	
OCT	.007	BDL	
	.004 <T	BDL	
NOV	.004 <T	BDL	
DEC	.010	BDL	
<hr/>			
TOTAL NITRATES (MG/L)		DET'N LIMIT = .020	GUIDELINE = 10.000 (A1)
MAR	.450	.420	
JUN	.340	.355	

TABLE 5

DRINKING WATER SURVEILLANCE PROGRAM WALPOLE ISLAND WATER TREATMENT PLANT 1987

WATER TREATMENT PLANT		DISTRIBUTION SYSTEM
RAW	TREATED	
<hr/>		
JUL	.275	.275
AUG	.255	.235
SEP	.275	.270
OCT	.280	.255
	.290	.295
NOV	.310	.290
DEC	.230	.235
<hr/>		
NITROGEN TOT KJELD (MG/L)		DET'N LIMIT = .020 GUIDELINE = N/A
MAR	.270	.150
JUN	.100	.070 <T
JUL	.130	.100
AUG	.080 <T	BDL
SEP	.150	.080 <T
OCT	.230 UAL	.280 UAL
	.200	.090 <T
NOV	.170	.080 <T
DEC	.180	.070 <T
<hr/>		
PH (DMSNLESS)		DET'N LIMIT = N/A GUIDELINE = 6.5-8.5(A4)
MAR	8.240	7.720
JUN	8.310	8.090
JUL	8.330	8.170
AUG	8.460	8.080
SEP	8.280	7.990

TABLE 5

DRINKING WATER SURVEILLANCE PROGRAM WALPOLE ISLAND WATER TREATMENT PLANT 1987

WATER TREATMENT PLANT			DISTRIBUTION SYSTEM	
	RAW	TREATED		

OCT	8.280	7.920		
	8.260	8.140		
NOV	8.250	8.210		
DEC	8.240	8.200		

PHOSPHORUS FIL REACT (MG/L)	DET'N LIMIT = .5UG/L		GUIDELINE =	N/A
MAR	.006	BDL		
JUN	.001 <T	.000 <T		
JUL	.000 <T	BDL		
AUG	.001 <T	.000 <T		
SEP	.000 <T	BDL		
OCT	.000 <T	BDL		
	BDL	BDL		
NOV	.001 <T	.000 <T		
DEC	BDL	BDL		

PHOSPHORUS TTL-UNFIL (MG/L)	DET'N LIMIT = .002		GUIDELINE = .40	(F2)
MAR	.029	.002 <T		
JUN	.003 <T	.005 <T		
JUL	.007 <T	.003 <T		
AUG	BDL	BDL		
SEP	.002 <T	BDL		
OCT	.014	.016		
	.007 <T	.004 <T		
NOV	.005 <T	.002 <T		

TABLE 5

DRINKING WATER SURVEILLANCE PROGRAM WALPOLE ISLAND WATER TREATMENT PLANT 1987

WATER TREATMENT PLANT		DISTRIBUTION SYSTEM	
	RAW	TREATED	
DEC	.005 <T	BDL	
RESIDUE (TOTAL) (MG/L)	DET'N LIMIT = 1.		GUIDELINE = 500. (A3)
MAR	180	173 CRO	
JUN	155 CRO	160 CRO	
JUL	150 CRO	157 CRO	
AUG	148 CRO	153 CRO	
SEP	146 CRO	152 CRO	
OCT	146 CRO	150 CRO	
	144 CRO	151 CRO	
NOV	149 CRO	150 CRO	
DEC	146 CRO	151 CRO	
TURBIDITY (FTU)	DET'N LIMIT = .02		GUIDELINE = 1.00 (A1)
MAR	34.000	.190	
JUN	1.220	.090	
JUL	1.680	.310	
AUG	4.700	.150	
SEP	3.000	.160	
OCT	4.500	.110	
	3.000	.030	
NOV	2.500	.050 <T	
DEC	3.300	.040	

TABLE 5

DRINKING WATER SURVEILLANCE PROGRAM WALPOLE ISLAND WATER TREATMENT PLANT 1987

WATER TREATMENT PLANT		DISTRIBUTION SYSTEM	
	RAW	TREATED	
<hr/>			
METALS			
ALUMINUM (MG/L)		DET'N LIMIT = .004	GUIDELINE = .10 (A4)
MAR	.570	.046	
JUN	.032	!WP	
JUL	.034	.290	
AUG	.056	.180	
SEP	.045	.100	
OCT	.094	.046	
	.083	.085	
NOV	.045	.068	
DEC	.087	.039	
<hr/>			
BARIUM (MG/L)		DET'N LIMIT = 0.001	GUIDELINE = 1.000 (A1)
MAR	.018	.014	
JUN	.015	!WP	
JUL	.018	.017	
AUG	.015	.015	
SEP	.014	.014	
OCT	.013	.014	
	.011	.011	
NOV	.012	.012	
DEC	.013	.013	
<hr/>			
BORON (MG/L)		DET'N LIMIT = 0.01	GUIDELINE = 5.000 (A1)
MAR	BDL	.020	

TABLE 5

DRINKING WATER SURVEILLANCE PROGRAM WALPOLE ISLAND WATER TREATMENT PLANT 1987

WATER TREATMENT PLANT		DISTRIBUTION SYSTEM
RAW	TREATED	
<hr/>		
JUN	BDL	BDL
JUL	BDL	BDL
AUG	.010 <T	.010 <T
SEP	.010 <T	.010 <T
OCT	.010 <T	.010 <T
	.010 <T	.010 <T
NOV	.020 <T	.020 <T
DEC	.019 <T	.031 <T
<hr/>		
CHROMIUM (MG/L)		DET'N LIMIT = 0.001 GUIDELINE = .05 (A1)
MAR	.001	BDL
JUN	.001	!WP
JUL	.001	.001
AUG	BDL	BDL
SEP	BDL	BDL
OCT	.001	.002
	.001	.001
NOV	.003	.002
DEC	.002	.002
<hr/>		
COPPER (MG/L)		DET'N LIMIT = .001 GUIDELINE = 1.0 (A3)
MAR	.001	.003
JUN	.001	!WP
JUL	.008	.004
AUG	.001	.003

TABLE 5

DRINKING WATER SURVEILLANCE PROGRAM WALPOLE ISLAND WATER TREATMENT PLANT 1987

WATER TREATMENT PLANT		DISTRIBUTION SYSTEM	
	RAW	TREATED	
<hr/>			
SEP	.001	.003	
OCT	.001	.006	
	.001	.002	
NOV	BDL	.002	
DEC	BDL	.002	
<hr/>			
IRON (MG/L)	DET'N LIMIT = .002		GUIDELINE = .300 (A3)
MAR	.850	.011	
JUN	.076	!WP	
JUL	.450	.011	
AUG	.068	.008	
SEP	.089	.005	
OCT	.140	.007	
	.100	.019	
NOV	.061	.016	
DEC	.140	.008	
<hr/>			
MERCURY (UG/L)	DET'N LIMIT = 0.010		GUIDELINE = 1.000 (A1)
MAR	BDL	BDL	
JUN	BDL	BDL	
JUL	.010	.010	
AUG	.010	.020	
SEP	.020	.020	
OCT	.010	.010	
	BDL	BDL	

TABLE 5

DRINKING WATER SURVEILLANCE PROGRAM WALPOLE ISLAND WATER TREATMENT PLANT 1987

WATER TREATMENT PLANT		DISTRIBUTION SYSTEM	
	RAW	TREATED	
<hr/>			
NOV	.010	.010	
DEC	.010	.010	
<hr/>			
MANGANESE (MG/L)		DET'N LIMIT = .001	GUIDELINE = .050 (A3)
MAR	.018	.003	
JUN	.003	!WP	
JUL	.006	.001	
AUG	.003	.001	
SEP	.003	.001	
OCT	.004	.001	
	.004	.001	
NOV	.003	.002	
DEC	.005	.002	
<hr/>			
MOLYBDENUM (MG/L)		DET'N LIMIT = 0.001	GUIDELINE = .50 (H)
MAR	BDL	BDL	
JUN	BDL	!WP	
JUL	BDL	BDL	
AUG	BDL	BDL	
SEP	.001	.001	
OCT	BDL	BDL	
	BDL	BDL	
NOV	BDL	BDL	
DEC	BDL	.001	
<hr/>			

TABLE 5

DRINKING WATER SURVEILLANCE PROGRAM WALPOLE ISLAND WATER TREATMENT PLANT 1987

WATER TREATMENT PLANT		DISTRIBUTION SYSTEM	
	RAW	TREATED	
<hr/>			
NICKEL (MG/L)			DET'N LIMIT = 0.001 GUIDELINE = .05 (F3)
MAR	.002	BDL	
JUN	BDL	!WP	
JUL	BDL	BDL	
AUG	BDL	BDL	
SEP	.002	BDL	
OCT	.001	.002	
	.003	.003	
NOV	.002	.001	
DEC	.001	.002	
<hr/>			
LEAD (MG/L)			DET'N LIMIT = 0.003 GUIDELINE = .050 (A1)
MAR	.005	.003	
JUN	BDL	!WP	
JUL	BDL	BDL	
AUG	BDL	BDL	
SEP	BDL	BDL	
OCT	BDL	BDL	
	BDL	BDL	
NOV	BDL	BDL	
DEC	BDL	.004	
<hr/>			
STRONTIUM (MG/L)			DET'N LIMIT = .001 GUIDELINE = 2.00 (H)
MAR	.130	.110	
JUN	.110	!WP	

TABLE 5

DRINKING WATER SURVEILLANCE PROGRAM WALPOLE ISLAND WATER TREATMENT PLANT 1987

WATER TREATMENT PLANT		DISTRIBUTION SYSTEM
	RAW	TREATED
<hr/>		
JUL	.100	.110
AUG	.099	.100
SEP	.093	.094
OCT	.097	.100
	.084	.085
NOV	.075	.081
DEC	.082	.082
<hr/>		
URANIUM (UG/L)	DET'N LIMIT = .02	
	GUIDELINE = 20. (A2)	
MAR	.270	BDL
JUN	.200	.040
JUL	.210	.020
AUG	.220	.060
SEP	.190	BDL
OCT	.240	BDL
	BDL	.270
NOV	.250	.110
DEC	.220	.090
<hr/>		
VANADIUM (MG/L)	DET'N LIMIT = .001	
	GUIDELINE = .10 (H)	
MAR	.001	BDL
JUN	BDL	!WP
JUL	BDL	BDL
AUG	BDL	BDL
SEP	BDL	BDL

TABLE 5

DRINKING WATER SURVEILLANCE PROGRAM WALPOLE ISLAND WATER TREATMENT PLANT 1987

WATER TREATMENT PLANT		DISTRIBUTION SYSTEM
	RAW	TREATED
<hr/>		
OCT	BDL	BDL
	BDL	BDL
NOV	BDL	BDL
DEC	BDL	BDL
<hr/>		
ZINC (MG/L)	DET'N LIMIT = .001	
	GUIDELINE = 5.00 (A3)	
MAR	.004	.003
JUN	.005	!WP
JUL	.010	.010
AUG	.007	.005
SEP	.006	.006
OCT	.006	.006
	BDL	BDL
NOV	.005	.007
DEC	.005	.006

TABLE 5

DRINKING WATER SURVEILLANCE PROGRAM WALPOLE ISLAND WATER TREATMENT PLANT 1987

WATER TREATMENT PLANT

DISTRIBUTION SYSTEM

RAW

TREATED

CHLOROAROMATICS

HEXACHLOROETHANE (NG/L)

DET'N LIMIT = 1.000

GUIDELINE = 1900. (D4)

MAR	BDL	BDL
JUN	BDL	BDL
JUL	7.000 <T	6.000 <T
AUG	BDL	BDL
SEP	BDL	BDL
OCT	BDL	BDL
	BDL	BDL
NOV	BDL	!LA
DEC	BDL	BDL

TABLE 5

DRINKING WATER SURVEILLANCE PROGRAM WALPOLE ISLAND WATER TREATMENT PLANT 1987

WATER TREATMENT PLANT		DISTRIBUTION SYSTEM	
	RAW	TREATED	

	PESTICIDES & PCB		
ALPHA BHC (NG/L)		DET'N LIMIT = 1.000	GUIDELINE = 700. (G)
MAR	2.000 <T	1.000 <T	
JUN	2.000 <T	2.000 <T	
JUL	2.000 <T	2.000 <T	
AUG	1.000 <T	2.000 <T	
SEP	BDL	1.000 <T	
OCT	1.000 <T	1.000 <T	
	2.000 <T	1.000 <T	
NOV	2.000 <T	!LA	
DEC	3.000 <T	1.000 <T	

TABLE 5

DRINKING WATER SURVEILLANCE PROGRAM WALPOLE ISLAND WATER TREATMENT PLANT 1987

WATER TREATMENT PLANT		DISTRIBUTION SYSTEM
RAW	TREATED	
<hr/>		
PHENOL (UG/L)	PHENOLICS	DET'N LIMIT = 0.2
		GUIDELINE = 2.00 (A3)
JUN	.600 <T	BDL
JUL	.400 <T	.200 <T
AUG	.200 <T	BDL
SEP	BDL	BDL
OCT	.400 <T	.400 <T
	BDL	BDL
NOV	BDL	BDL
DEC	.200 <T	BDL

TABLE 5

DRINKING WATER SURVEILLANCE PROGRAM WALPOLE ISLAND WATER TREATMENT PLANT 1987

WATER TREATMENT PLANT			DISTRIBUTION SYSTEM	
	RAW	TREATED		
<hr/>				
VOLATILES				
BENZENE (UG/L)			DET'N LIMIT = 0	GUIDELINE = 5.0 (D1)
MAR	BDL	BDL		
JUN	BDL	BDL		
JUL	BDL	BDL		
AUG	BDL	.100 <T		
SEP	BDL	.300 <T		
OCT	.200 <T	.100 <T		
	.250 <T	.300 <T		
NOV	.250 <T	.500 <T		
DEC	BDL	.150 UCS		
<hr/>				
TOLUENE (UG/L)			DET'N LIMIT = 0	GUIDELINE = 100.0 (G)
MAR	BDL	BDL		
JUN	BDL	BDL		
JUL	BDL	BDL		
AUG	BDL	BDL		
SEP	BDL	.250 <T		
OCT	BDL	BDL		
	BDL	BDL		
NOV	BDL	.150 <T		
DEC	BDL	.100 UCS		
<hr/>				
ETHYLBENZENE (UG/L)			DET'N LIMIT = 0	GUIDELINE = 3400. (D3)
MAR	BDL	BDL		

TABLE 5

DRINKING WATER SURVEILLANCE PROGRAM WALPOLE ISLAND WATER TREATMENT PLANT 1987

WATER TREATMENT PLANT		DISTRIBUTION SYSTEM
RAW	TREATED	
<hr/>		
JUN	BDL	BDL
JUL	BDL	BDL
AUG	BDL	.100 <T
SEP	BDL	.100 <T
OCT	BDL	BDL
	BDL	BDL
NOV	BDL	.050 <T
DEC	BDL	BDL
<hr/>		
O-XYLENE (UG/L)		DET'N LIMIT = 0 GUIDELINE = 620. (G)
MAR	BDL	BDL
JUN	BDL	BDL
JUL	BDL	BDL
AUG	BDL	BDL
SEP	BDL	BDL
OCT	BDL	.200 <T
	BDL	BDL
NOV	BDL	BDL
DEC	BDL	BDL
<hr/>		
CHLOROFORM (UG/L)		DET'N LIMIT = 0 GUIDELINE = 350.0 (A1+)
MAR	BDL	8.000
JUN	BDL	14.900
JUL	BDL	14.000
AUG	BDL	18.000

TABLE 5

DRINKING WATER SURVEILLANCE PROGRAM WALPOLE ISLAND WATER TREATMENT PLANT 1987

WATER TREATMENT PLANT			DISTRIBUTION SYSTEM
	RAW	TREATED	
<hr/>			
SEP	BDL	20.500	
OCT	BDL	18.100	
	BDL	23.100	
NOV	BDL	12.900	
DEC	BDL	22.100	
<hr/>			
111, TRICHLOROETHANE (UG/L)		DET'N LIMIT = 0	GUIDELINE = 200. (D1)
MAR	BDL	BDL	
JUN	BDL	BDL	
JUL	BDL	BDL	
AUG	BDL	BDL	
SEP	BDL	BDL	
OCT	BDL	BDL	
	.100 <T	BDL	
NOV	BDL	BDL	
DEC	BDL	BDL	
<hr/>			
DICHLOROBROMOMETHANE (UG/L)		DET'N LIMIT = 0	GUIDELINE = 350.0 (A1+)
MAR	BDL	10.000	
JUN	BDL	10.700	
JUL	BDL	12.000	
AUG	BDL	10.800	
SEP	BDL	9.800	
OCT	BDL	8.400	
	BDL	12.600	

TABLE 5

DRINKING WATER SURVEILLANCE PROGRAM WALPOLE ISLAND WATER TREATMENT PLANT 1987

WATER TREATMENT PLANT		DISTRIBUTION SYSTEM	
	RAW	TREATED	
<hr/>			
NOV	BDL	10.300	
DEC	BDL	16.700	
<hr/>			
CHLORODIBROMOMETHANE (UG/L)		DET'N LIMIT = 0	GUIDELINE = 350.0 (A1+)
MAR	BDL	7.000	
JUN	BDL	6.600	
JUL	BDL	8.000	
AUG	BDL	6.400	
SEP	BDL	4.800	
OCT	BDL	4.400	
	BDL	7.200	
NOV	BDL	6.600	
DEC	BDL	9.800	
<hr/>			
T-CHLOROETHYLENE (UG/L)		DET'N LIMIT = 0	GUIDELINE = 10.0 (C2)
MAR	BDL	BDL	
JUN	BDL	.100 <T	
JUL	BDL	BDL	
AUG	BDL	BDL	
SEP	BDL	BDL	
OCT	BDL	BDL	
	.050 <T	BDL	
NOV	BDL	BDL	
DEC	BDL	BDL	
<hr/>			

TABLE 5

DRINKING WATER SURVEILLANCE PROGRAM WALPOLE ISLAND WATER TREATMENT PLANT 1987

WATER TREATMENT PLANT			DISTRIBUTION SYSTEM	
	RAW	TREATED		
<hr/>				
BROMOFORM (UG/L)			DET'N LIMIT = 0	GUIDELINE = 350.0 (A1+)
MAR	BDL	2.000		
JUN	BDL	BDL		
JUL	BDL	BDL		
AUG	BDL	.200 <T		
SEP	BDL	.400 <T		
OCT	BDL	.200 <T		
	BDL	.800 <T		
NOV	BDL	.600 <T		
DEC	BDL	.600 <T		
<hr/>				
TOTL TRIHALOMETHANES (UG/L)			DET'N LIMIT = 0	GUIDELINE = 350.0 (A1)
MAR	BDL	27.000		
JUN	BDL	33.200		
JUL	BDL	34.000		
AUG	BDL	35.400		
SEP	BDL	35.500		
OCT	BDL	31.100		
	BDL	43.700		
NOV	BDL	30.400		
DEC	BDL	49.200		
<hr/>				

TABLE 6

DRINKING WATER SURVEILLANCE PROGRAM WALPOLE ISLAND WATER TREATMENT PLANT 1987

COUNT OF PARAMETERS NOT FOUND ABOVE THE DETECTION LIMIT

SCAN -----	PARAMETER -----	ANALYSED -----	DETECTION LIMIT -----	GUIDELINE -----	
CHEMISTRY (LAB)	CYANIDE	18	0.001	.200 (A1)	MG/L
METALS	ARSENIC	18	0.001	.050 (A1)	MG/L
	BERYLLIUM	18	0.001	.0002 (H)	MG/L
	CYANIDE	18	0.001	.200 (A1)	MG/L
	CADMIUM	18	0.300	5.000 (A1)	UG/L
	COBALT	18	0.001	1.0 (H)	MG/L
	SELENIUM	18	0.001	.010 (A1)	MG/L
CHLOROAROMATICS	HEXACHLOROBUTADIENE	18	1.000	450. (D4)	NG/L
	123 TRICHLOROBENZENE	18	5.000	10000. (1)	NG/L
	1234 T-CHLOROBENZENE	18	1.000	10000. (1)	NG/L
	1235 T-CHLOROBENZENE	18	1.000	10000. (1)	NG/L
	124 TRICHLOROBENZENE	18	5.000	10000. (1)	NG/L
	1245 T-CHLOROBENZENE	18	1.000	38000. (D4)	NG/L
	135 TRICHLOROBENZENE	18	5.000	10000. (D4)	NG/L
	OCTACHLOROSTYRENE	18	1.000	N/A	NG/L
	PENTACHLOROBENZENE	18	1.000	74000. (D4)	NG/L
	236 TRICHLOROTOLUENE	18	5.000	N/A	NG/L
	245 TRICHLOROTOLUENE	18	5.000	N/A	NG/L
	26A TRICHLOROTOLUENE	18	5.000	N/A	NG/L
CHLOROPHENOLS	234 TRICHLOROPHENOL	3	50.	N/A	NG/L
	2345 T-CHLOROPHENOL	3	50.	N/A	NG/L
	2356 T-CHLOROPHENOL	3	50.	N/A	NG/L
	245-TRICHLOROPHENOL	3	50.	2600000(D4)	NG/L
	246-TRICHLOROPHENOL	3	50.	10000. (C1)	NG/L
	PENTACHLOROPHENOL	3	50.	10000. (C1)	NG/L
PAH	PHENANTHRENE	10	0	N/A	NG/L
	ANTHRACENE	10	0	N/A	NG/L
	FLUORANTHENE	10	0	42000 (D4)	NG/L
	PYRENE	10	0	N/A	NG/L
	BENZO(A)ANTHRACENE	10	0	N/A	NG/L
	CHRYSENE	10	0	N/A	NG/L
	DIMETH. BENZ(A)ANTHR	10	0	N/A	NG/L
	BENZO(E)PYRENE	10	0	N/A	NG/L
	BENZO(J) FLUORANTHENE	10	N/A	N/A	NG/L
	BENZO(B) FLUORANTHENE	10	0	N/A	NG/L
	PERYLENE	10	0	N/A	NG/L
	BENZO(K) FLUORANTHENE	10	N/A	N/A	NG/L
	BENZO (A) PYRENE	10	0	10 (B1)	NG/L
	BENZO(G,H,I) PERYLENE	10	0	N/A	NG/L
	DIBENZO(A,H) ANTHRAC	10	0	N/A	NG/L
	INDENO(1,2,3-C,D) PY	10	0	N/A	NG/L
	BENZO(B) CHRYSENE	10	0	N/A	NG/L
	ANTHANTHRENE	10	N/A	N/A	NG/L
	CORONENE	10	0	N/A	NG/L
PESTICIDES & PCB	ALDRIN	18	1.000	700.0 (A1)	NG/L
	BETA BHC	18	1.000	300. (G)	NG/L

TABLE 6

DRINKING WATER SURVEILLANCE PROGRAM WALPOLE ISLAND WATER TREATMENT PLANT 1987

COUNT OF PARAMETERS NOT FOUND ABOVE THE DETECTION LIMIT

SCAN	PARAMETER	ANALYSED	DETECTION LIMIT	GUIDELINE
----	-----	-----	-----	-----
PESTICIDES & PCB	LINDANE	18	1.000	4000.0 (A1) NG/L
	ALPHA CHLORDANE	18	2.000	7000.0 (A1) NG/L
	GAMMA CHLORDANE	18	2.000	7000.0 (A1) NG/L
	DIELDRIN	18	2.000	700.0 (A1) NG/L
	METHOXYCHLOR	18	5.000	100000. (A1) NG/L
	THIODAN I	18	2.000	74000. (D4) NG/L
	THIODAN II	18	4.000	74000. (D4) NG/L
	ENDRIN	18	4.000	200.0 (A1) NG/L
	THIODAN SULPHATE	18	4.000	N/A NG/L
	HEPTACHLOR EPOXIDE	18	1.000	3000.0 (A1) NG/L
	HEPTACHLOR	18	1.000	3000.0 (A1) NG/L
	MIREX	18	5.000	N/A NG/L
	OXYCHLORDANE	18	2.000	N/A NG/L
	OPDDT	18	5.000	30000. (A1) NG/L
	PCB	18	20.000	3000. (A2) NG/L
	PP-DDD	18	5.000	N/A NG/L
	PPDDE	18	1.000	30000. (A1) NG/L
	PPDDT	18	5.000	30000. (A1) NG/L
	ATRATONE	16	50.	N/A NG/L
	ALACHLOR	16	500.	35000. (D2) NG/L
	ETHYLENE DIBROMIDE	18	0	50.0 (G) UG/L
	HCB	18	1.000	10.0 (C1) NG/L
SPECIFIC PESTICIDES	TOXAPHENE	18	N/A	5000. (A1) NG/L
	AMETRYNE	18	50.00	300000. (D3) NG/L
	ATRAZINE	18	50.00	60000. (B3) NG/L
	BLADEX	18	100.00	10000. (B3) NG/L
	PROMETONE	18	50.00	52500. (D3) NG/L
	PROPAZINE	18	50.00	16000. (D2) NG/L
	PROMETRYNE	18	50.00	1000. (B3) NG/L
	SENCOR	18	100.00	80000. (B2) NG/L
	SIMAZINE	18	50.00	10000. (B3) NG/L
	2,4,5-T	3	50.00	35000. (D2) NG/L
	2,4-D	3	100.00	100000. (A1) NG/L
	24DCHLRPHENOXYBUTYRC	3	200.00	18000. (B3) NG/L
	2,4-DP	3	100.00	N/A NG/L
	DICAMBA	3	100.00	87000. (B3) NG/L
	PICHLORAM	3	100.00	2450000 (D3) NG/L
	SILVEX	3	50.00	10000. (A1) NG/L
	DIAZINON	4	20.	14000. (A1) NG/L
	DICHLOROVOS	4	20.	N/A NG/L
	DURSBAN	4	20.	N/A NG/L
	ETHION	4	20.	35000. (G) NG/L
	GUTHION	4	N/A	N/A NG/L
	MALATHION	4	20.	160000. (G) NG/L
	MEVINPHOS	4	20.	N/A NG/L
	METHYL PARATHION	4	50.	7000. (B3) NG/L
	METHYLTRITHION	4	20.	N/A NG/L
	PARATHION	4	20.	35000. (B1) NG/L
	PHORATE	4	20.	35.0 (D2) NG/L
	RELDAN	4	20.	N/A NG/L
	RONNEL	4	20.	N/A NG/L

TABLE 6

DRINKING WATER SURVEILLANCE PROGRAM WALPOLE ISLAND WATER TREATMENT PLANT 1987

COUNT OF PARAMETERS NOT FOUND ABOVE THE DETECTION LIMIT

SCAN	PARAMETER	ANALYSED	DETECTION LIMIT	GUIDELINE
----	-----	-----	-----	-----
SPECIFIC PESTICIDES	AMINOCARB	4	N/A	N/A NG/L
	BENOMYL	4	N/A	N/A NG/L
	BUX	4	2000.	N/A NG/L
	CARBOFURAN	4	2000.	18000. (D3) NG/L
	CIPC	4	2000.	350000. (G) NG/L
	DIALATE	4	2000.	30000. (H) NG/L
	EPTAM	4	2000.	N/A NG/L
	IPC	4	2000.	N/A NG/L
	PROPOXUR	4	2000.	90000. (G) NG/L
	SEVIN	4	200.	70000. (A1) NG/L
	SUTAN	4	2000.	245000. (D3) NG/L
	METOLACHLOR	16	500.	50000. (B3) NG/L
VOLATILES	P-XYLENE	18	0	620. (G) UG/L
	M-XYLENE	18	0	620. (G) UG/L
	1,1 DICHLOROETHYLENE	18	0	7.0 (D1) UG/L
	DICHLOROMETHANE	18	0	1750. (D3) UG/L
	1,1,2DICHLOROETHYLENE	18	0	350. (D3) UG/L
	1,1 DICHLOROETHANE	18	0	N/A UG/L
	1,2 DICHLOROETHANE	18	0	5.0 (D1) UG/L
	CARBON TETRACHLORIDE	18	0	5.0 (D1) UG/L
	1,2 DICHLOROPROPANE	18	0	10.0 (G) UG/L
	TRICHLOROETHYLENE	18	0	5.0 (D1) UG/L
	112 TRICHLOROETHANE	18	0	.60 (D4) UG/L
	1122 T-CHLOROETHANE	18	0	0.17 (D4) UG/L
	CHLOROBENZENE	18	0	1510. (D3) UG/L
	1,4 DICHLOROBENZENE	18	0	75.0 (D1) UG/L
	1,3 DICHLOROBENZENE	18	0	130. (G) UG/L
	1,2 DICHLOROBENZENE	18	0	130. (G) UG/L
	TRIFLUOROCHLOROTOLUE	18	0	N/A UG/L
	ETHYLENE DIBROMIDE	18	0	50.0 (G) UG/L

Appendix A

DRINKING WATER SURVEILLANCE PROGRAM

The Drinking Water Surveillance Program (DWSP) for Ontario monitors drinking water quality at municipal water supply systems. The DWSP Database Management System provides a computerized drinking water quality information system for the supplies monitored. The objectives of the program are to provide:

- immediate, reliable, current information on drinking water quality,
- a flagging mechanism for 'Objective' exceedence,
- a definition of contaminant levels and trends,
- a comprehensive background for remedial action,
- a framework for assessment of new contaminants,
- and an indication of treatment efficiency of plant processes.

Program

The DWSP officially began in April 1986 and is designed to eventually include all municipal water supplies in Ontario; currently 44 plants are being monitored. Water supply locations have been prioritized for surveillance, based primarily on criteria such as population density, probability of contamination and geographical location.

An ongoing assessment of future monitoring requirements at each location will be made. Monitoring will continue at the initial locations at an appropriate level and further locations will be phased into the program as resources permit. It is estimated that after 4 years of operation, the program will be monitoring 90 locations.

A major goal of the program is to collect valid water quality data, in context with plant operational characteristics at the time of sampling. As soon as sufficient data have been accumulated and analysed, both the frequency of sampling and the range of parameters may be adjusted accordingly.

Assessments are carried out at all locations prior to initial sampling in order to acquire complete plant process and distribution system details, and to designate (and retrofit if necessary) all sampling systems and locations. This ensures that the sampled water is a reflection of the water itself.

Samples are taken of the raw (ambient water) and the treated water at the treatment plant, and of consumer's tap water in the distribution system. In order to determine possible effects of distribution on water quality, both standing and free flow water in old and new sections of the distribution system are sampled.

Sampling is carried out by operational personnel who have been trained in the applicable procedures.

Comprehensive standardized procedures and Field Test kits are supplied to sampling personnel. This ensures that samples are taken and handled according to standard protocols and that field testing will supply reliable data. All field and laboratory analyses are carried out using "approved documented procedures". All laboratory analyses are carried out by the MOE Laboratory Services Branch.

Data Reporting Mechanism

When the analytical results are transferred from the MOE laboratory into the DWSP system, printouts of the completed analyses are sent to the MOE District Officer, the appropriate operational staff and are also retained by the DWSP co-ordinator.

DWSP INPUTS AND OUTPUTS

The DWSP INPUTS and OUTPUTS are illustrated in Fig. 1.

PROGRAM INPUTS

PLANT AND DISTRIBUTION SYSTEM DESCRIPTION

The system description includes plant specific non-analytical information acquired through a questionnaire and initial plant visit. During the initial assessment of the plant and distribution system the questionnaire content is verified and

missing information added. It is intended that all data be kept current with scheduled annual updates.

The PLANT and DISTRIBUTION SYSTEM DESCRIPTION consists of the following seven components.

1. Process component inventory

All physical and chemical processes that the water is subjected to, from the intake pipe to the consumers' tap (where possible), are documented. These include: process type, general description of physical structures, material types, sizes, and retention time for each process within the plant. The processes may be as simple as transmission or as complex as carbon adsorption.

2. Treatment chemicals

Chemicals used in the treatment processes, their function, application point, supplier and brand-name are recorded. The chemical dosages applied on the day of sampling are recorded in DWSP.

3. Process control measurements

Documentation of in-plant monitoring of process parameters (turbidity, chlorine residuals, pH, aluminum residuals) including methods used, monitoring locations and frequency is contained in this section. In-plant monitoring results are generally not retained in DWSP but are retained by the Water Treatment Plant.

4. Design flow and retention time

The hydraulic capacity, designed and actual, is noted here. Retention time (the time that a block of water is retained in the plant) is also noted. The maximum, minimum and average flow as well as a record of the flow rate on the day of sampling are recorded in DWSP.

5. Distribution system description

This area includes the storage and transmission characteristics of the distribution system after the water leaves the plant.

6. Sampling system

Each plant is assessed for its adequacy in terms of sampling of bacteriological, organic and inorganic parameters. The prime considerations in the assessment and design of the sampling system are:

- i/ the sample is an accurate representation of the actual water condition, eg. raw water has had no chemical treatment;
- ii/ the water being sampled is not being modified by the sampling system;
- iii/ the sample tap must be in a clean area of the plant, preferably a lab area;
- iv/ the sample lines must be organically inert (no plastic, ideally stainless steel).

It is imperative that the sampled water be a reflection not of the sampling system but of the water itself.

The sampling system documentation includes: origin of the water; date sampling was initiated; size, length and material type (intake, discharge and tap), pump characteristics (model, type, capacity) and flow rate.

7. People

This section contains the names, addresses and phone numbers of current plant management and operational staff, distribution system management and operational staff, Medical Officer of Health and appropriate Ministry of Environment personnel associated with the plant.

FIELD DATA

The second major input to DWSP is field data.

Field data is collected at the plant and from the distribution system sites on the day of sampling. The field data consists of general operating conditions and the results of testing for field parameters. General operating conditions include chemicals used, dosages, flow and retention time on the day of sampling as well as monthly maximum, minimum and average flows. Field parameters include turbidity, chlorine residuals (free, combined and total), temperature and pH. These parameters are analysed according to standardized DWSP protocols to allow for interplant comparison.

LABORATORY ANALYTICAL DATA

The third major input to DWSP is Laboratory Analytical Data.

Samples gathered from the raw, treated and distribution sampling sites are analyzed for approximately 160 parameters at a frequency of two to twelve times per year. Sixty-five percent of the parameters are organic. The parameters measured may have health or aesthetic implications when present in drinking water. Many of the parameters may be used in the treatment process or may be treatment by-products. Due to the nature of certain analytical instruments parameters may be measured for in a "scan" producing some results for parameters that are not on the DWSP priority list but which may be of interest. The majority of the parameters are measured on a routine basis however, those that are technically more difficult and/or costly to analyse for are done less frequently. These include Specific Pesticides and Chlorophenols.

Although the parameter list is extensive, additional parameters with the potential to cause health or aesthetic related problems may be added provided reliable analytical and sampling methods exist.

All laboratory generated data is derived from standardized, documented analytical protocols. The analytical method is an integral part of the data and as methods change notation will be made and intercomparison data documented.

PARAMETER REFERENCE INFORMATION

The fourth major input to DWSP is Parameter Reference Information

This is a catalogue of information for each substance analysed on DWSP. It includes parameter name and aliases, physical and chemical properties, basic toxicology, world-wide health limits, treatment methods and uses. The Parameter Reference Information is computerized and can be accessed through the Query function of the DWSP database.

An example is shown in fig. 2.

A written copy (hard version) of the Parameter Reference Information will be available in the near future and is a new and sophisticated enhancement to the DWSP.

PROGRAM OUTPUTS

There are four major program outputs, Query, Action Alert, Report Generation and the Annual Report.

QUERY

All DWSP information is easily accessed through the Query function, therefore anything from addresses of plant personnel to complete water quality information for a plant's water supply is instantly available. The DWSP computer system makes relatively complex inquiries manageable. A personal password allowing access into the DWSP query mode in all MOE offices is being developed by the DWSP group.

ACTION ALERTS

Drinking Water quality in Ontario is evaluated against provincial objectives as outlined in the publication, Ontario Drinking Water Objectives (ISBN 0-7729-2725-1 revised 1983). This publication contains health-related Maximum Acceptable Concentrations for thirty substances. Should the reported level of a substance in treated water exceed the Ontario Drinking Water Objective an "Action Alert" requiring resampling and confirmation is issued. This assures that operational staff, health authorities and the public are notified as soon as possible of confirmation of an exceedance and remedial action taken. This report supplies a history of the occurrence of past exceedences at the plant plus a historical summary on the parameter of concern.

In the absence of Ontario Drinking Water Objectives, other agency guidelines which are documented in the Parameter Reference Information may be used. If these guidelines are exceeded the results are flagged and evaluated by DWSP personnel. An "Action Alert" will be issued if warranted.

REPORT GENERATION

Custom reports can be generated from DWSP to meet the needs of the regions and to respond to public requests.

ANNUAL REPORTS

It is the practice of DWSP to produce an annual report containing analytical data along with companion plant information.

FIG. 1

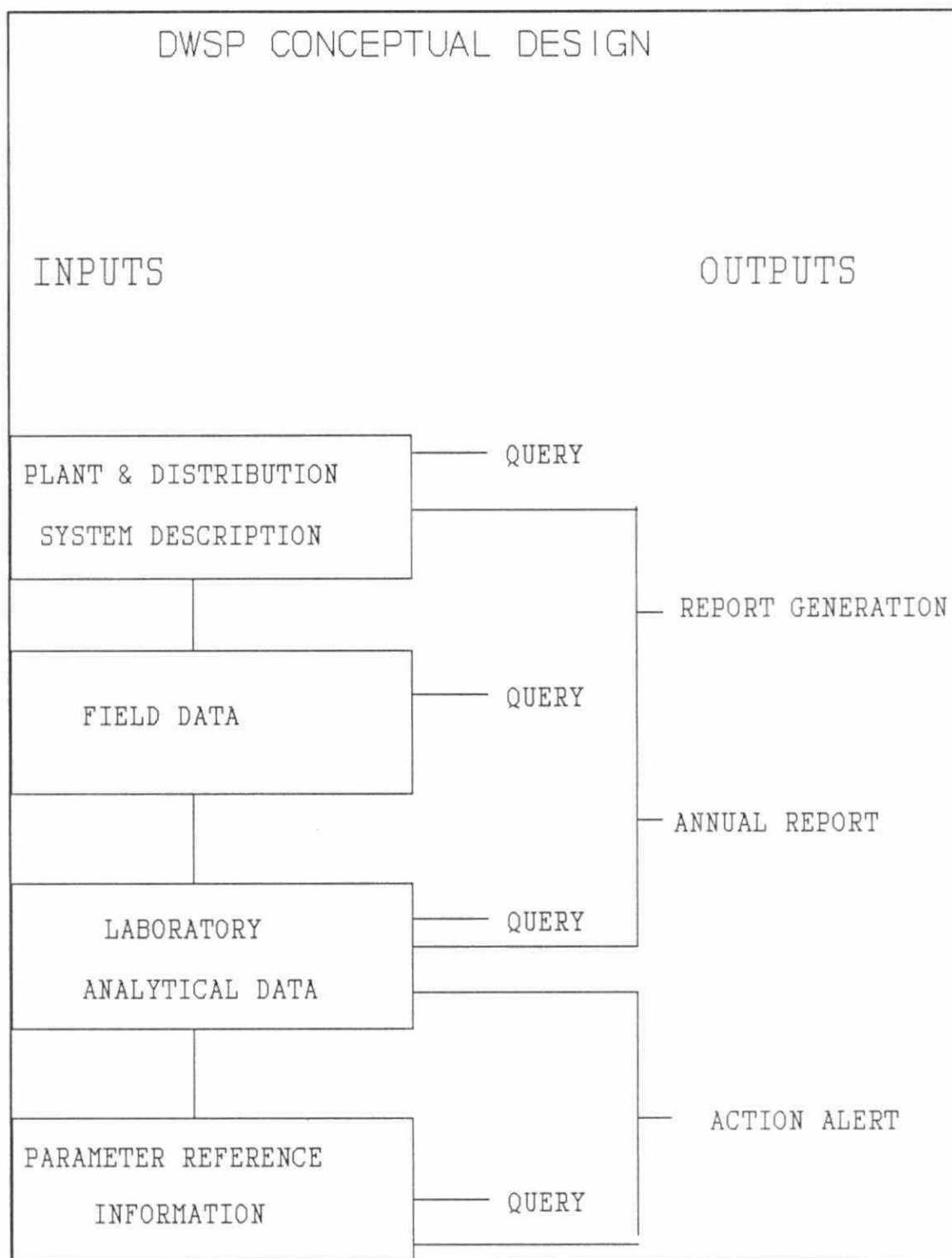


FIG.2

MOE - DRINKING WATER ASSESSMENT PROGRAM (DWSP)

(B2001P)
REFERENCE
BENZENE

PARAMETER

SOURCE	FROM	TO	METHOD	TARG	UNIT	NOTE
EPA	C 86/04		NOMETH	.00	063000 UG/L	RMCL
EPAA	C 80/11		NOMETH	6.60	063000 UG/L	
FERC	C 84/05		NOMETH	1.00	063000 UG/L	
WHO	C 84/01		NOMETH	10.00	064000 UG/L	

DESCRIPTION: NAME: BENZENE

CAS#: 71432

MOLECULAR FORMULAE: C_6H_6

DETECTION LIMIT: (FOR METHOD POCODO) 0.05 UG/L

SYNONYMS: BENZOLE, COAL NAPHTHA, CARBON OIL (27),
CYCLOHEXATRIENE (41)CHARACTERISTICS: COLOURLESS TO LIGHT YELLOW, MOBILE,
NON-POLAR LIQUID, OF HIGHLY REFRACTIVE NATURE,
AROMATIC, VAPOURS BURN WITH SMOKING FLAME (30)

PROPERTIES:

SOLUBILITY IN WATER: 1780-1800 MG/L AT 25 DEG C (41)

THRESHOLD ODOUR: NO DATA

THRESHOLD TASTE: 0.5 MG/L IN WATER (39)

ENVIRONMENTAL FATE: MAY BIOACCUMUALTE IN LIVING
ORGANISMS, APPEARS TO BIOACCUMULATE IN ANIMAL
TISSUES THAT EXHIBIT HIGH LIPID CONTENT OR ARE
MAJOR METABOLIC SITES (LIVER, BRAIN), SMALL
QUANTITIES EVAPORATE FROM SOIL OR DEGRADE QUICKLYSOURCES: PETROLEUM REFINING, SOLVENT RECOVERY, COAL
TAR DISTILLATION, FOOD PROCESSING, TANNING.USES: PREPERATION OF ETHYL BENZENE USED AS A STYRENE
MONOMER, DETERGENTS, NYLON, AS INTERMEDIATE IN
PESTICIDE PRODUCTION, SOLVENT IN RUBBER INDUSTRY,
DEGREASING AND CLEANSING AGENT, GASOLINE.TOXICITY: RATING 4 (VERY TOXIC); ACUTE - IRRITATES
MUCOUS MEMBRANES, SYMPTONS INCLUDE RESTLESSNESS,
CONVULSIONS, DEPRESSION, RESPIRATORY FAILURE;

CHRONIC - ANEMIA AND LEUKEMIA (45).

CARINOGENICITY: HUMAN CARCINOGEN AND MUTAGEN

REMOVAL: GAC ADSORPTION, PRECIPITATION WITH ALUM
FOLLOWED BY SEDIMENTATION, COAGULATION AND
FLOCCULATION, SOLVENT EXTRACTION, OXIDATION (41).

MOLECULAR WEIGHT: 78.12 GRAMS

MELTING POINT: 5.5 DEGREES C (27)

BOILING POINT: 80.1 DEGREES C (27)

SPECIFIC GRAVITY: 0.879 AT 20 DEGREES C (27)

VAPOUR PRESSURE: 100 MM AT 26.1 DEGREES C

HENRY'S LAW CONSTANT: 0.00555 ATM M_3 /MOLE

LOG OCT./WATER PAR.COEFF:K=1.0 1/N=1.6 R=.97 PH=5.3

Appendix B

DWSP SAMPLING GUIDELINE

i) RAW and TREATED at PLANT

General Chemistry	<ul style="list-style-type: none">-500 mL clear plastic bottle-rinse bottle with sample three times and discard water-fill to line
Bacti	<ul style="list-style-type: none">-250 mL clear glass bottle with white seal on cap-do <u>not</u> rinse bottle; preservative has been added-avoid touching bottle neck or inside of cap-fill to top of red label as marked
Metals	<ul style="list-style-type: none">-500 mL clear plastic bottle with white lid-rinse bottle and cap three times, discard-fill to line-add 10 drops nitric acid (Caution: HNO_3 is corrosive)
Volatiles (OPOPUP)	<ul style="list-style-type: none">-250 mL clear glass bottle-do <u>not</u> rinse bottle-tilt bottle when filling-fill bottle completely; there should be no air bubbles.
Organic (OWOC), (OWTRI), (OAPAHX)	<ul style="list-style-type: none">-1 liter brown glass bottle per scan-do <u>not</u> rinse bottle-fill to approx. 1" from top-when 'special pesticides' are requested three extra bottles per sample must be submitted
Cyanide	<ul style="list-style-type: none">-500 mL clear plastic bottle-do <u>not</u> rinse bottle-fill to approx. 1" from top-add 10 drops sodium hydroxide (Caution: NaOH is corrosive)

Mercury

- 250 mL clear glass bottle
- rinse bottle and cap three times, discard then fill to top of label
- add 20 drops each nitric acid and potassium dichromate
- (**Caution:** HNO_3 and KCrO_7 corrosive)

Phenols

- 250 mL clear glass bottle
- do not rinse bottle
- fill to top of label as marked

Steps

1. Let cold water tap run for several minutes.
2. Record time in submission sheet.
3. Record teperature on submission sheet.
4. Fill up all bottles as per instructions.
5. Record chlorine residuals (free, combined and total for treated water only), turbidity and pH on submission sheet.

ii) Distribution Samples (standing water)

General Chemistry

- 500 mL clear plastic bottle
- rinse bottle with sample three times and discard
- fill to line

Metals

- 500 mL clear plastic bottle with white lid
- rinse bottle and cap three times, discard
- fill to line
- add 10 drops nitric acid
(Caution: HNO_3 is corrosive)

Steps:

1. Record time on submission sheet.
2. Place bucket under tap and open cold water.
3. Fill to predetermined volume.
4. After mixing the water, record the temperature on the submission sheet.
5. Fill general chemistry and metals bottles.
6. Record chlorine residuals (free, combined and total), turbidity and pH on submission sheet.

iii) Distribution Samples (free flow)

General Chemistry	<ul style="list-style-type: none">-500 mL clear plastic bottle-rinse bottle with sample three times and discard water-fill to line
Bacti	<ul style="list-style-type: none">-250 mL clear glass bottle with white seal on cap-do <u>not</u> rinse bottle; preservative has been added-avoid touching bottle neck or inside of cap-fill to top of red label as marked
Metals	<ul style="list-style-type: none">-500 mL clear plastic bottle with white lid-rinse bottle and cap three times, discard-fill to line-add 10 drops nitric acid (Caution: HNO_3 is corrosive)
Volatiles (OPOPUP)	<ul style="list-style-type: none">-250 mL clear glass bottle-do <u>not</u> rinse bottle; preservative has been added-tilt bottle when filling-fill bottle completely; there should be no air bubbles
Organic (OWOC), (OWTRI)	<ul style="list-style-type: none">-1 liter brown glass bottle per scan-do <u>not</u> rinse bottle: preservative has been added-fill to approx. 1" from top
Cyanide	<ul style="list-style-type: none">-500 mL clear plastic bottle-do <u>not</u> rinse bottle: preservative has been added-fill to approx. 1" from top-add 10 drops sodium hydroxide (Caution: NaOH is corrosive)
Mercury	<ul style="list-style-type: none">-250 mL clear glass bottle-rinse bottle and cap three times, discard then fill to top of label-add 20 drops each nitric acid and potassium dichromate (Caution: HNO_3 and KCrO_7 corrosive)

Steps:

1. Record time on submission sheet.
2. Let cold water flow for ten minutes.
3. Record temperature on submission sheet.
4. Fill all bottles as per instructions.
5. Record chlorine residuals (free, combined and total), turbidity and pH on submission sheet.

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Walpole island water treatment
plant : annual report 1987.
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